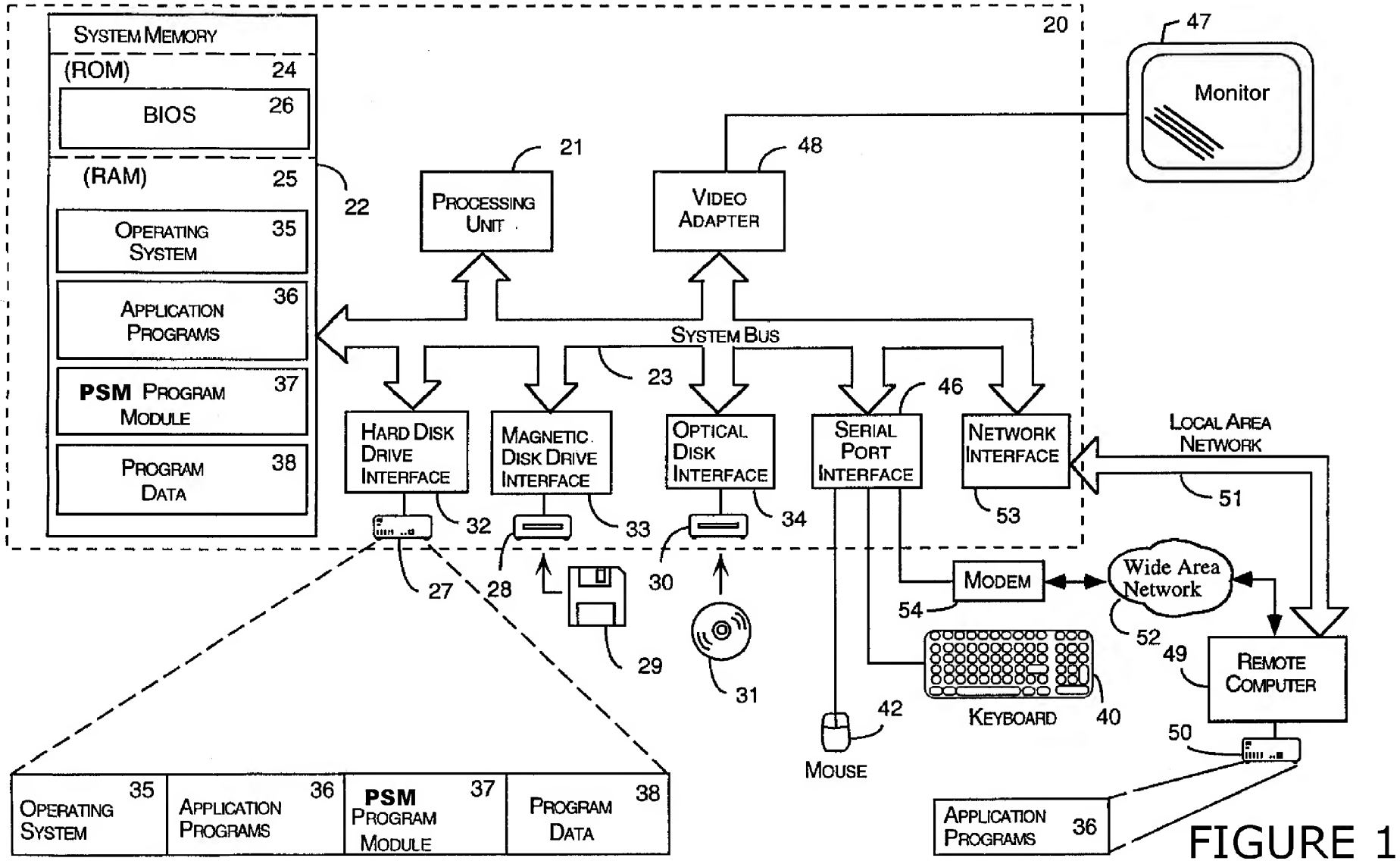

20
SYSTEM MEMORY
(ROM) 24
BIOS 26
(RAM) 25
22
OPERATING SYSTEM 35
APPLICATION PROGRAMS 36
PSM PROGRAM MODULE 37
PROGRAM DATA 38
47
Monitor
21
PROCESSING UNIT
48
VIDEO ADAPTER
SYSTEM BUS
23
46
HARD DISK DRIVE INTERFACE
MAGNETIC DISK DRIVE INTERFACE
OPTICAL DISK INTERFACE
SERIAL PORT INTERFACE
NETWORK INTERFACE
LOCAL AREA NETWORK
51
53
32
33
34
27
28
30
29
31
MODEM
54
Wide Area Network
52
49
REMOTE COMPUTER
KEYBOARD
40
42
MOUSE
50
APPLICATION PROGRAMS 36
35 OPERATING SYSTEM
36 APPLICATION PROGRAMS
37 PSM PROGRAM MODULE
38 PROGRAM DATA

FIGURE 1

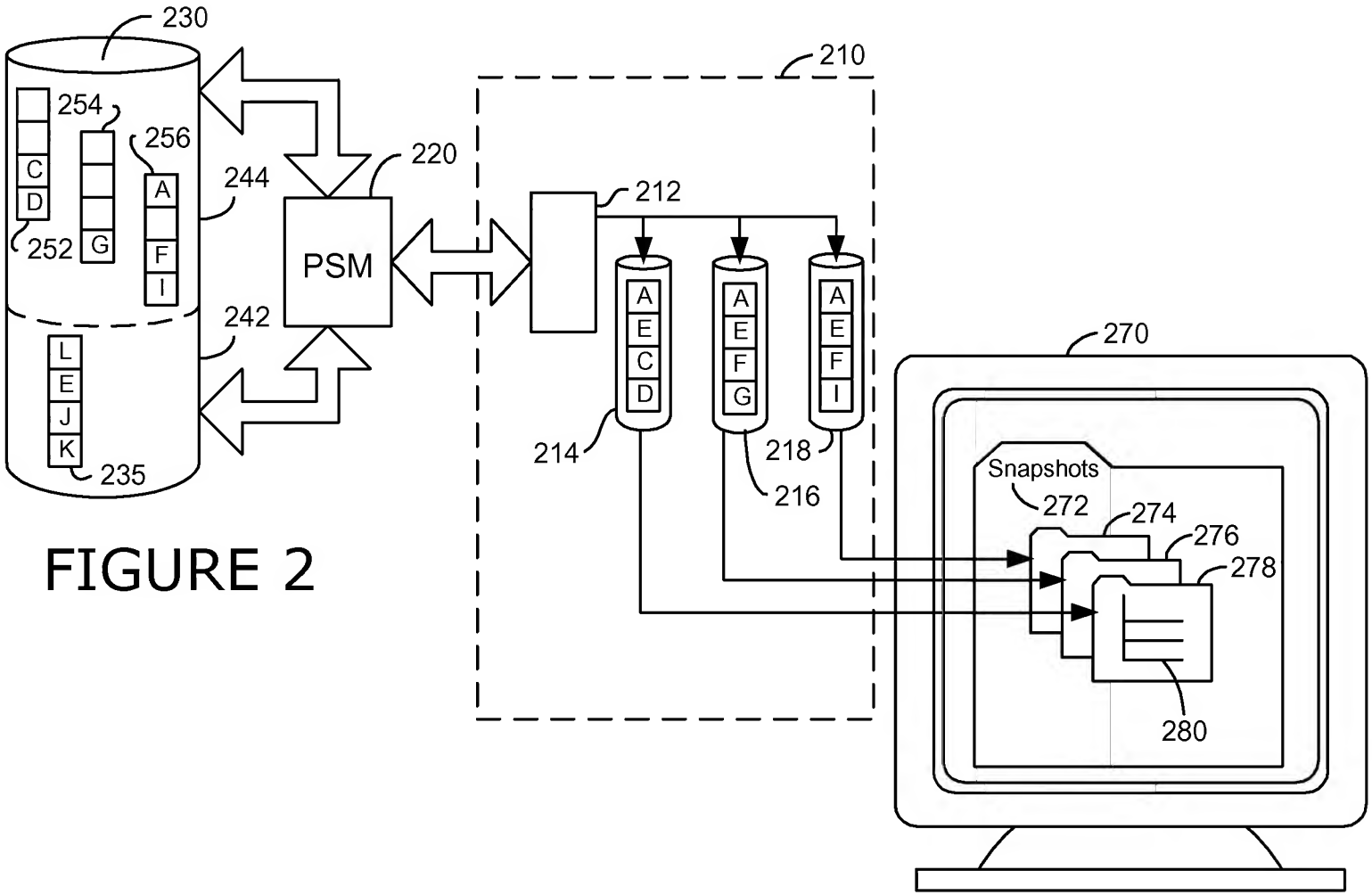

230
254
256
C
D
A
G
F
I
252
244
242
L
E
J
K
235
220
PSM
210
212
A
E
C
D
A
E
F
G
A
E
F
I
214
218
216
270
Snapshots
272
274
276
278
280

FIGURE 2

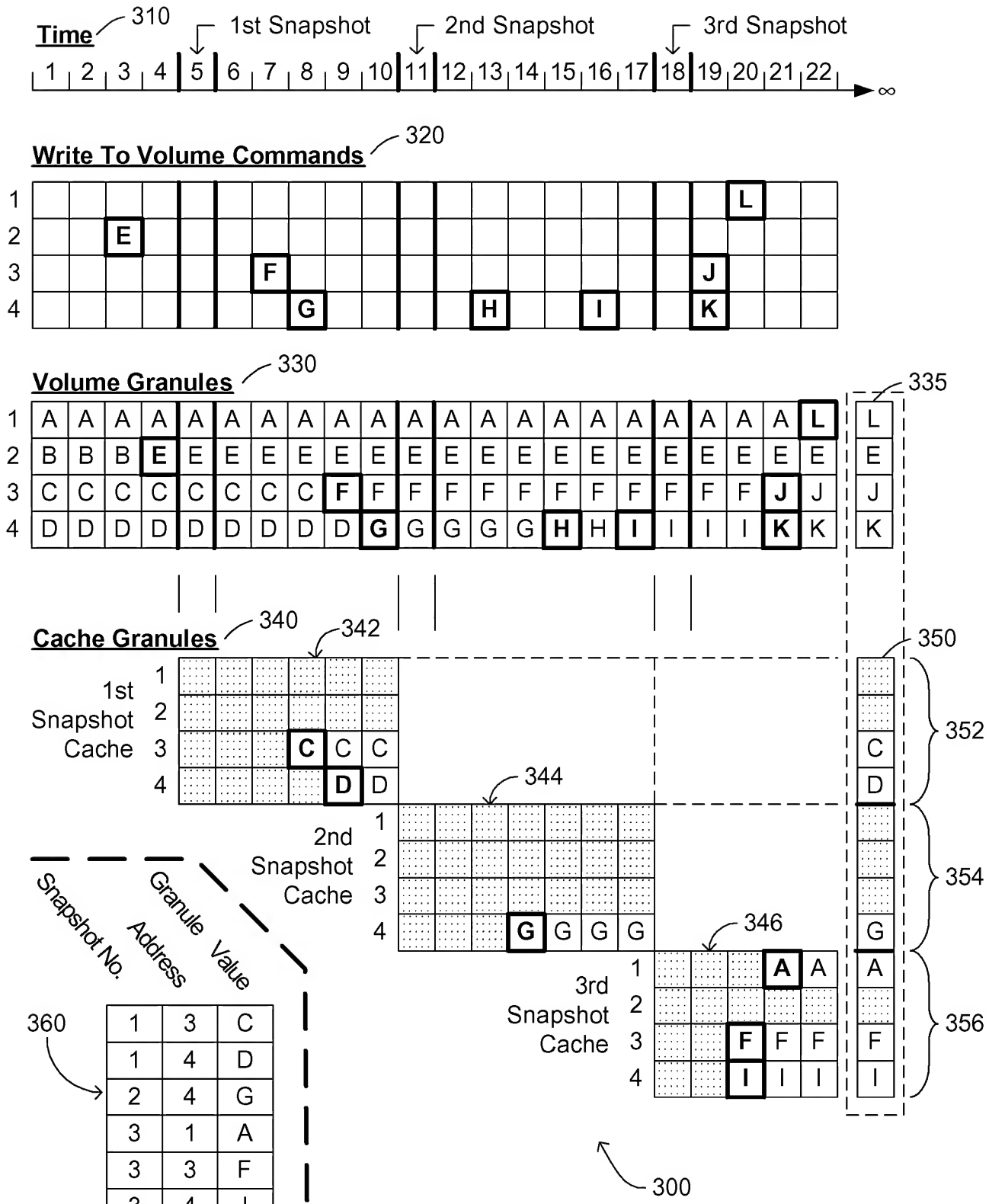
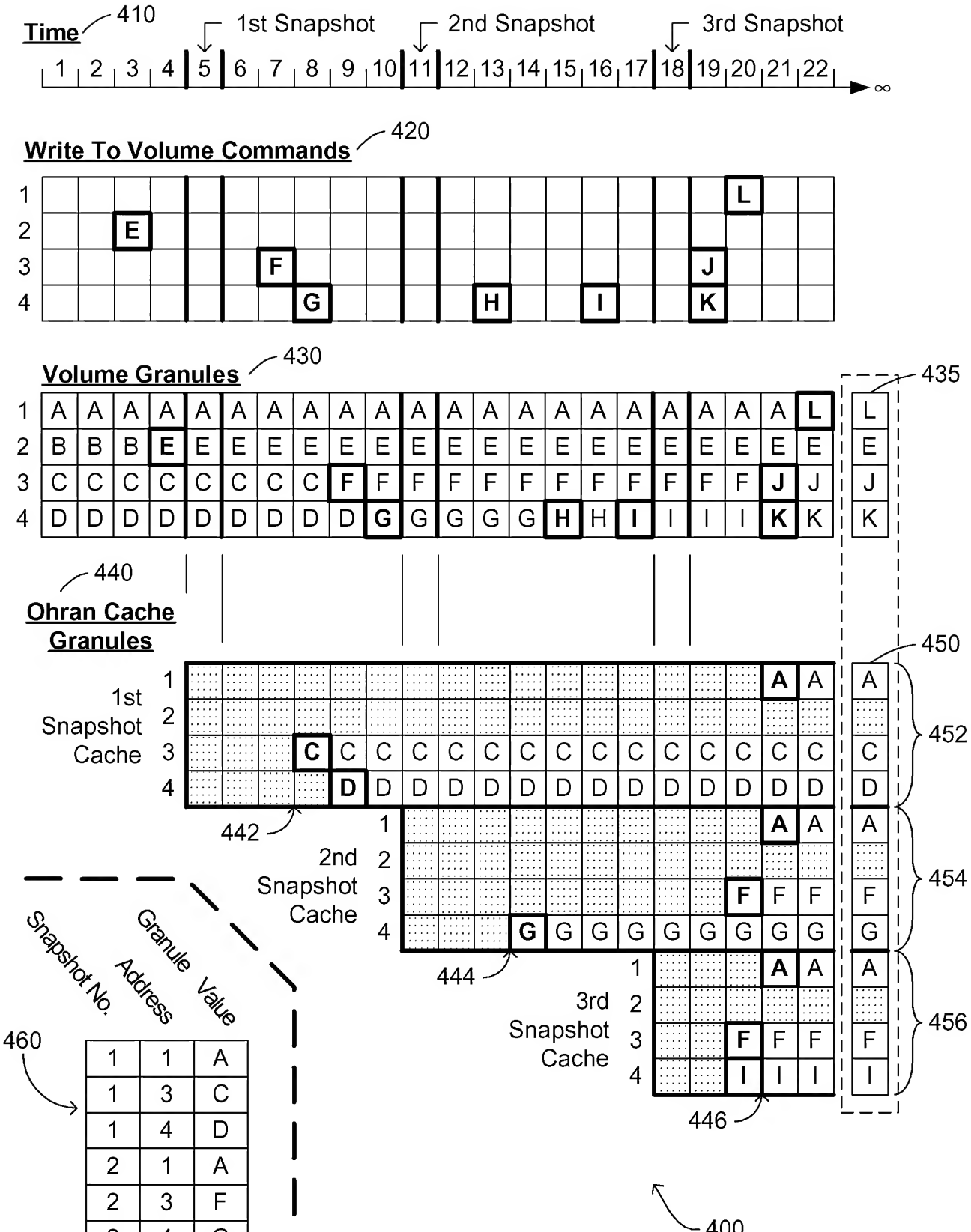

Time
310
1st Snapshot
2nd Snapshot
3rd Snapshot
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 ∞
Write To Volume Commands
320
Volume Granules
330
335
Cache Granules
340
342
350
1st Snapshot Cache
2nd Snapshot Cache
3rd Snapshot Cache
344
346
352
354
356
Snapshot No.
Granule Address
Value
360
1 3 C
1 4 D
2 4 G
3 1 A
3 3 F
3 4 I
300

FIGURE 3



Snapshot No.	Granule Address	Value
1	1	A
1	3	C
1	4	D
2	1	A
2	3	F
2	4	G
3	1	A
3	3	F
3	4	I

FIGURE 4
(PRIOR ART)

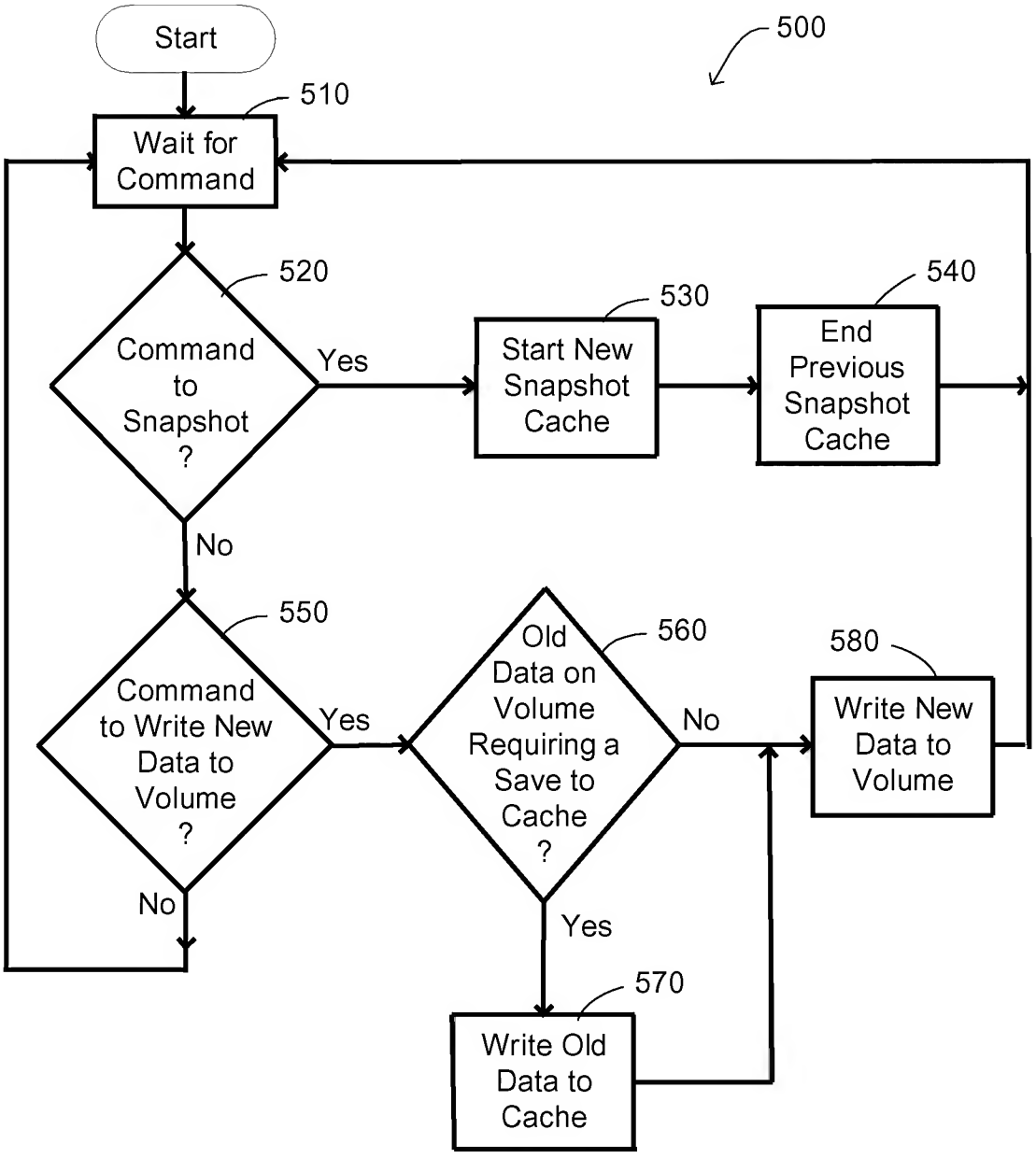

Start
500
510
Wait for Command
520
Command to Snapshot ?
Yes
530
Start New Snapshot Cache
540
End Previous Snapshot Cache
No
550
Command to Write New Data to Volume ?
Yes
560
Old Data on Volume Requiring a Save to Cache ?
No
580
Write New Data to Volume
No
Yes
570
Write Old Data to Cache

FIGURE 5

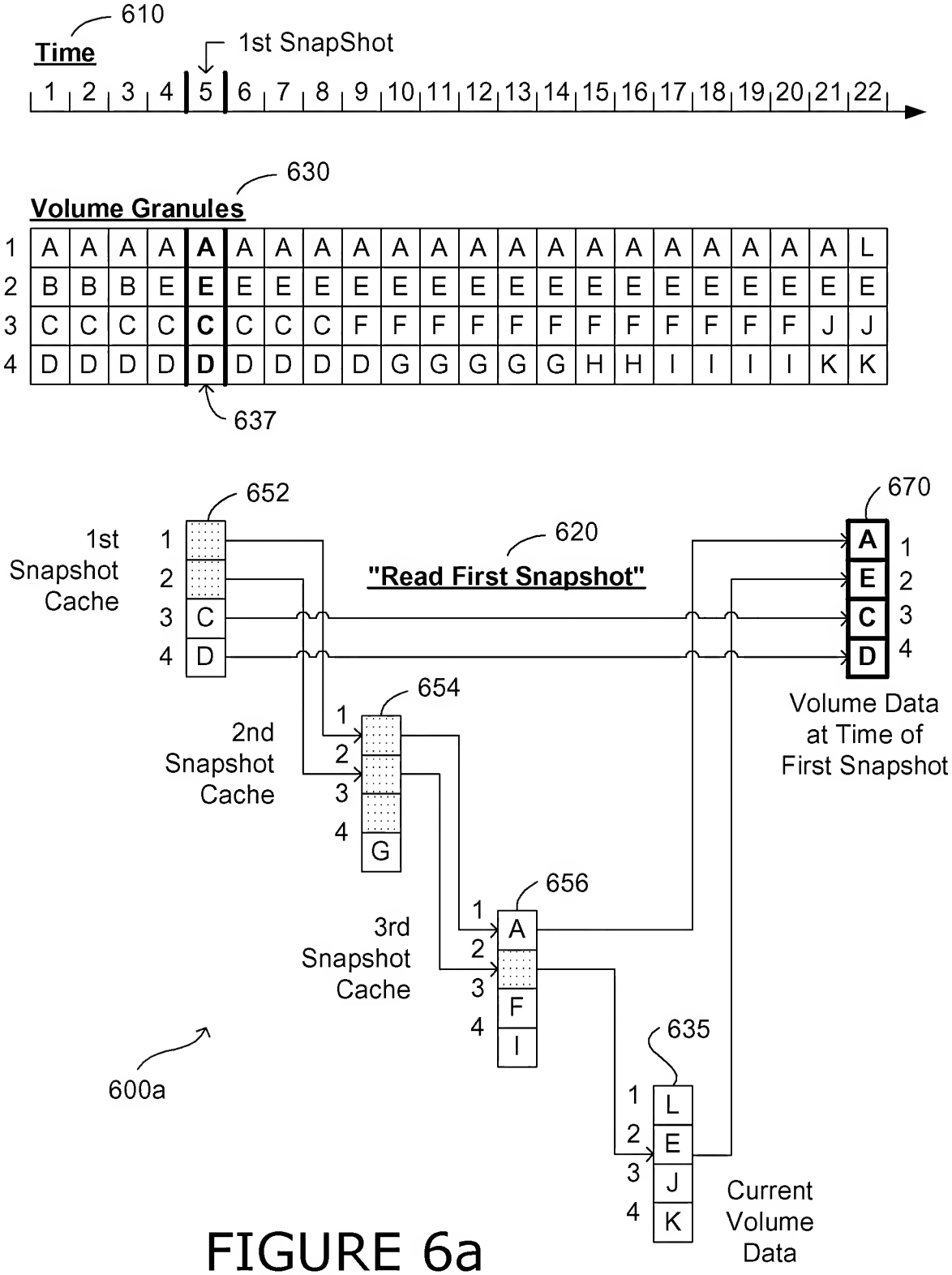

610
Time
1st SnapShot
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
630
Volume Granules
637
652
1st Snapshot Cache
620
"Read First Snapshot"
670
Volume Data at Time of First Snapshot
654
2nd Snapshot Cache
656
3rd Snapshot Cache
635
Current Volume Data
600a

FIGURE 6a

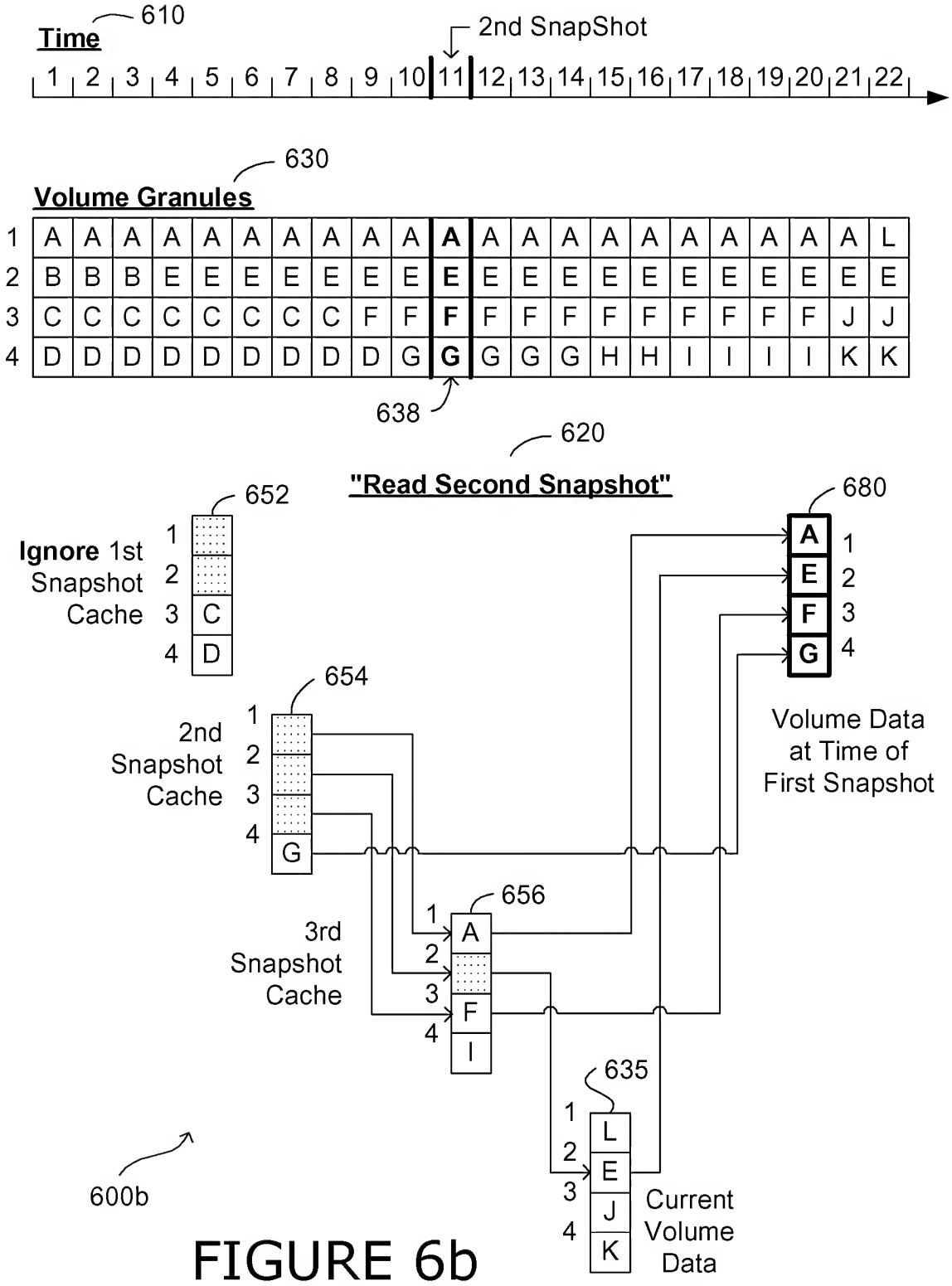

610
Time
2nd SnapShot
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
630
Volume Granules
638
620
"Read Second Snapshot"
652
Ignore 1st Snapshot Cache
654
2nd Snapshot Cache
656
3rd Snapshot Cache
680
Volume Data at Time of First Snapshot
635
Current Volume Data
600b

FIGURE 6b

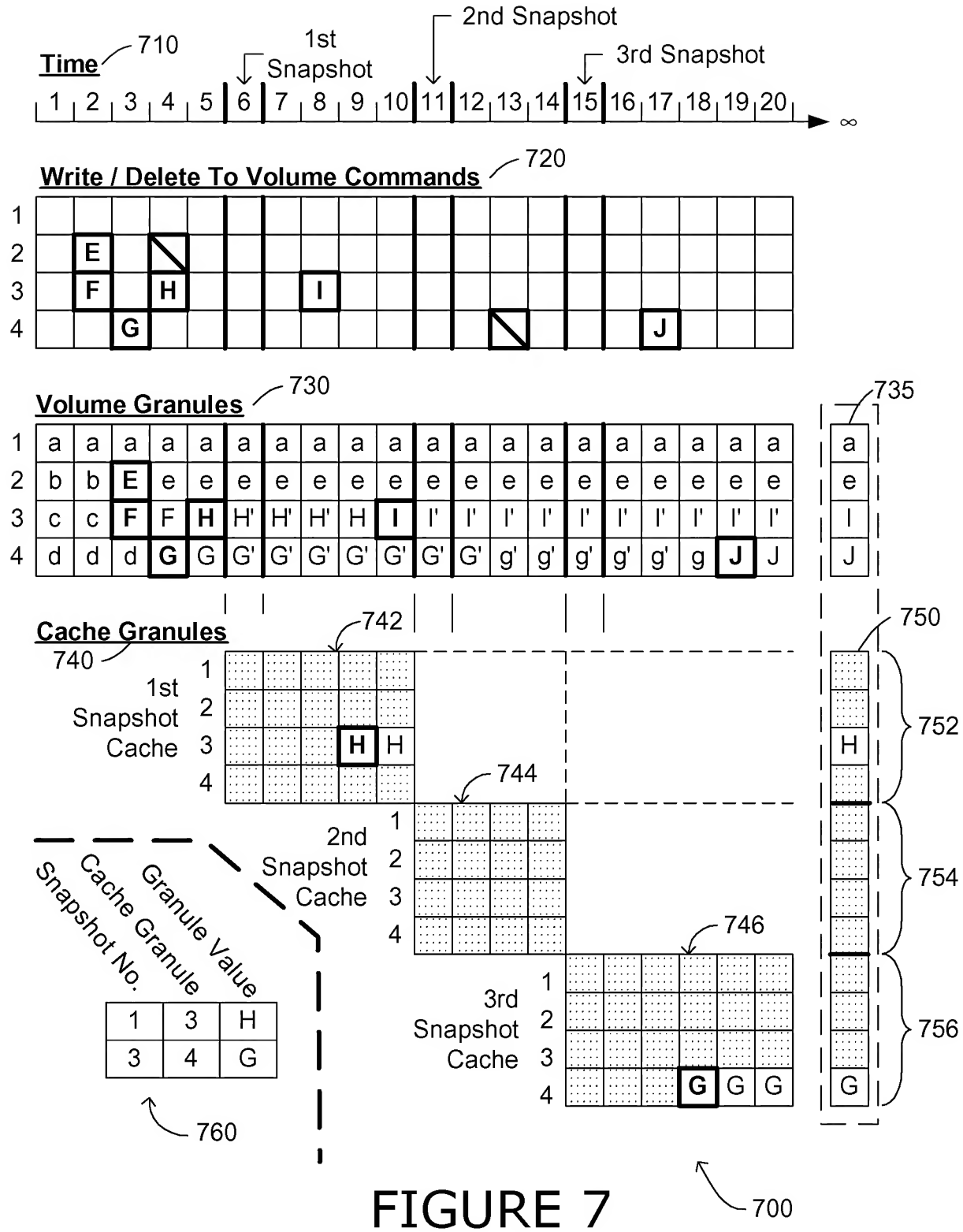

Time
710
1st Snapshot
2nd Snapshot
3rd Snapshot
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 ∞
Write / Delete To Volume Commands
720
Volume Granules
730
735
Cache Granules
740
742
744
746
750
752
754
756
1st Snapshot Cache
2nd Snapshot Cache
3rd Snapshot Cache
Snapshot No.
Cache Granule
Granule Value
1 3 H
3 4 G
760
700

FIGURE 7

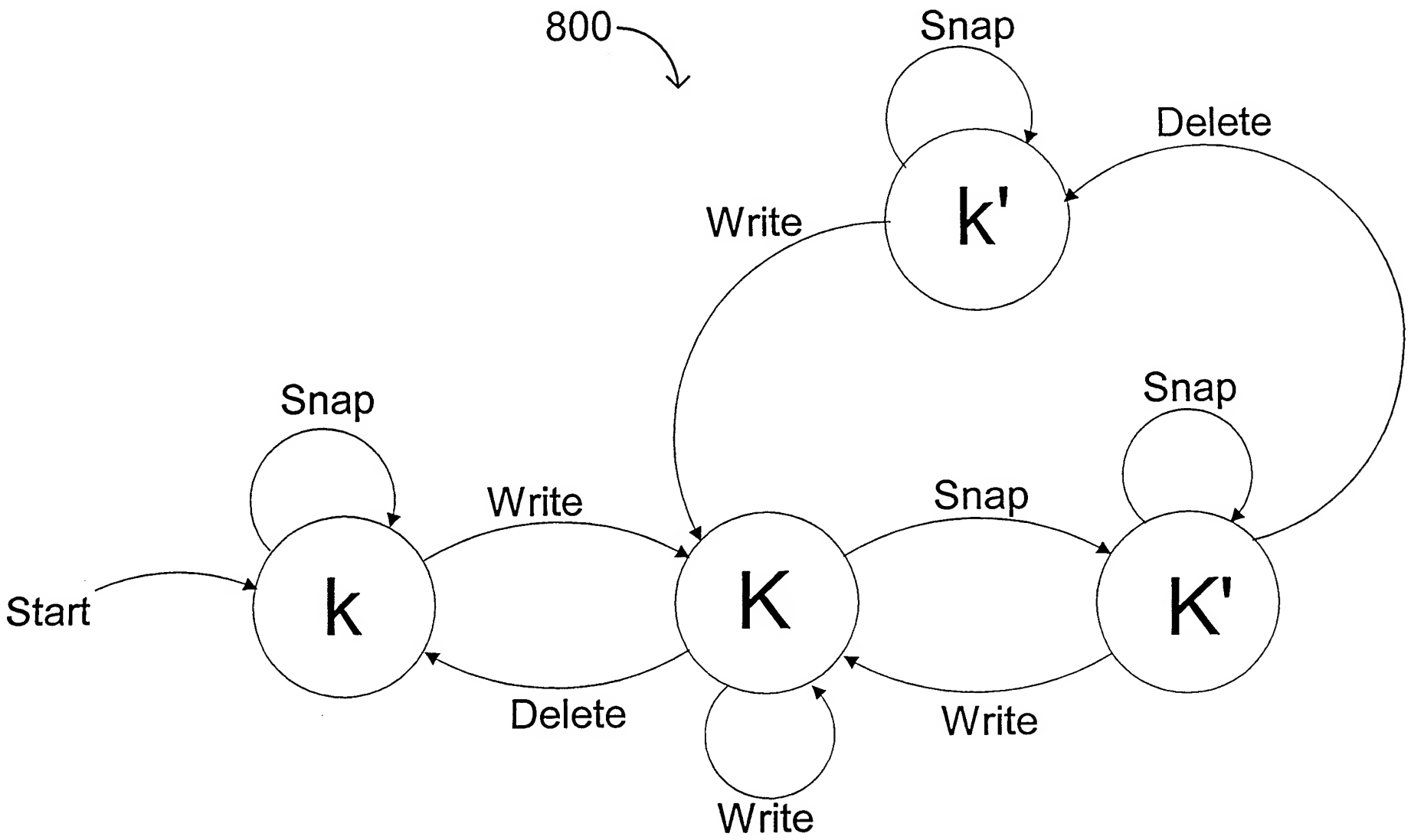

800
Snap
Delete
k'
Write
Snap
Snap
Write
Snap
Start
k
K
K'
Delete
Write
Write

Fig. 8

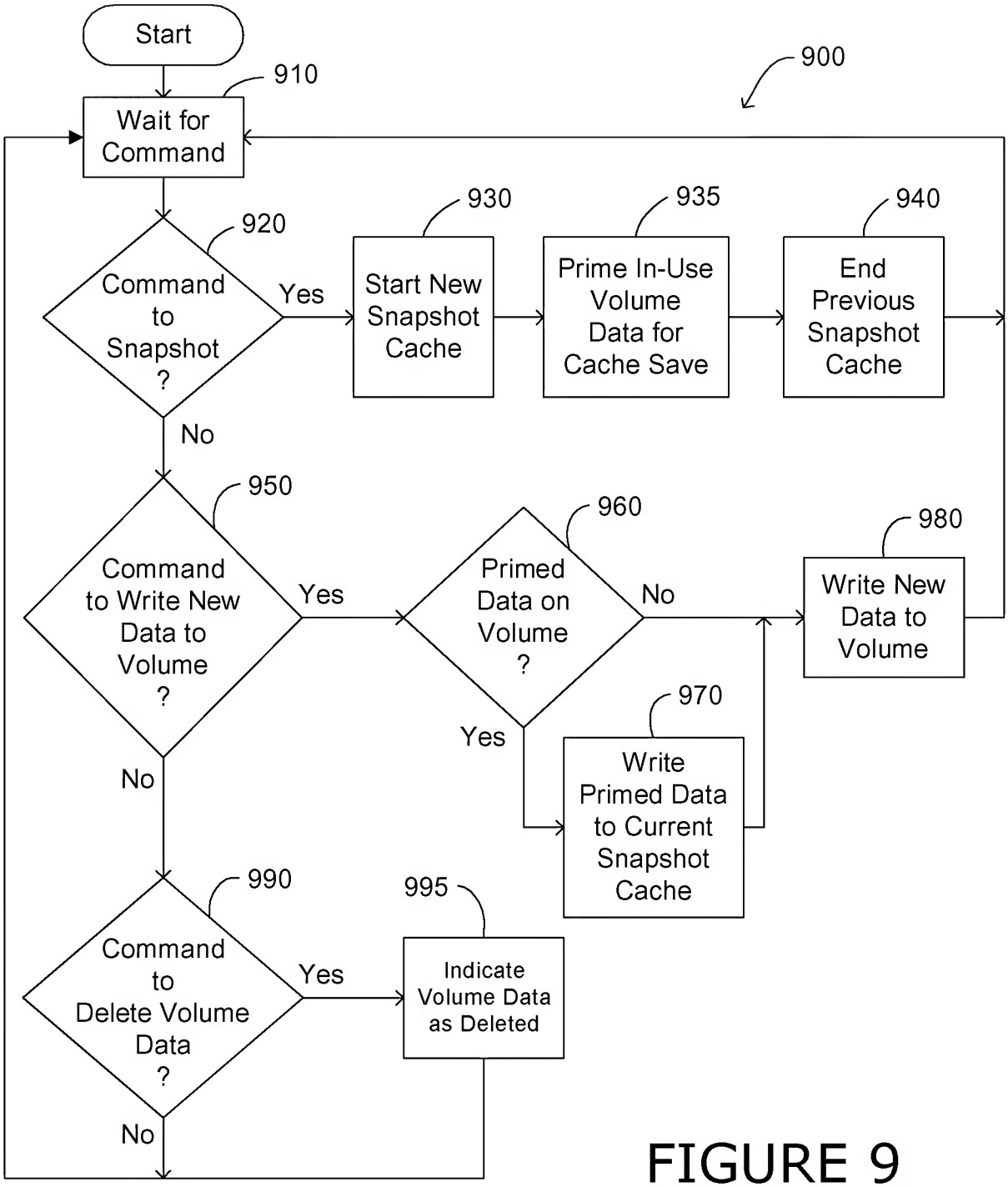

Start
900
910
Wait for Command
920
Command to Snapshot ?
Yes
930
Start New Snapshot Cache
935
Prime In-Use Volume Data for Cache Save
940
End Previous Snapshot Cache
No
950
Command to Write New Data to Volume ?
Yes
960
Primed Data on Volume ?
No
980
Write New Data to Volume
Yes
970
Write Primed Data to Current Snapshot Cache
No
990
Command to Delete Volume Data ?
Yes
995
Indicate Volume Data as Deleted
No

FIGURE 9

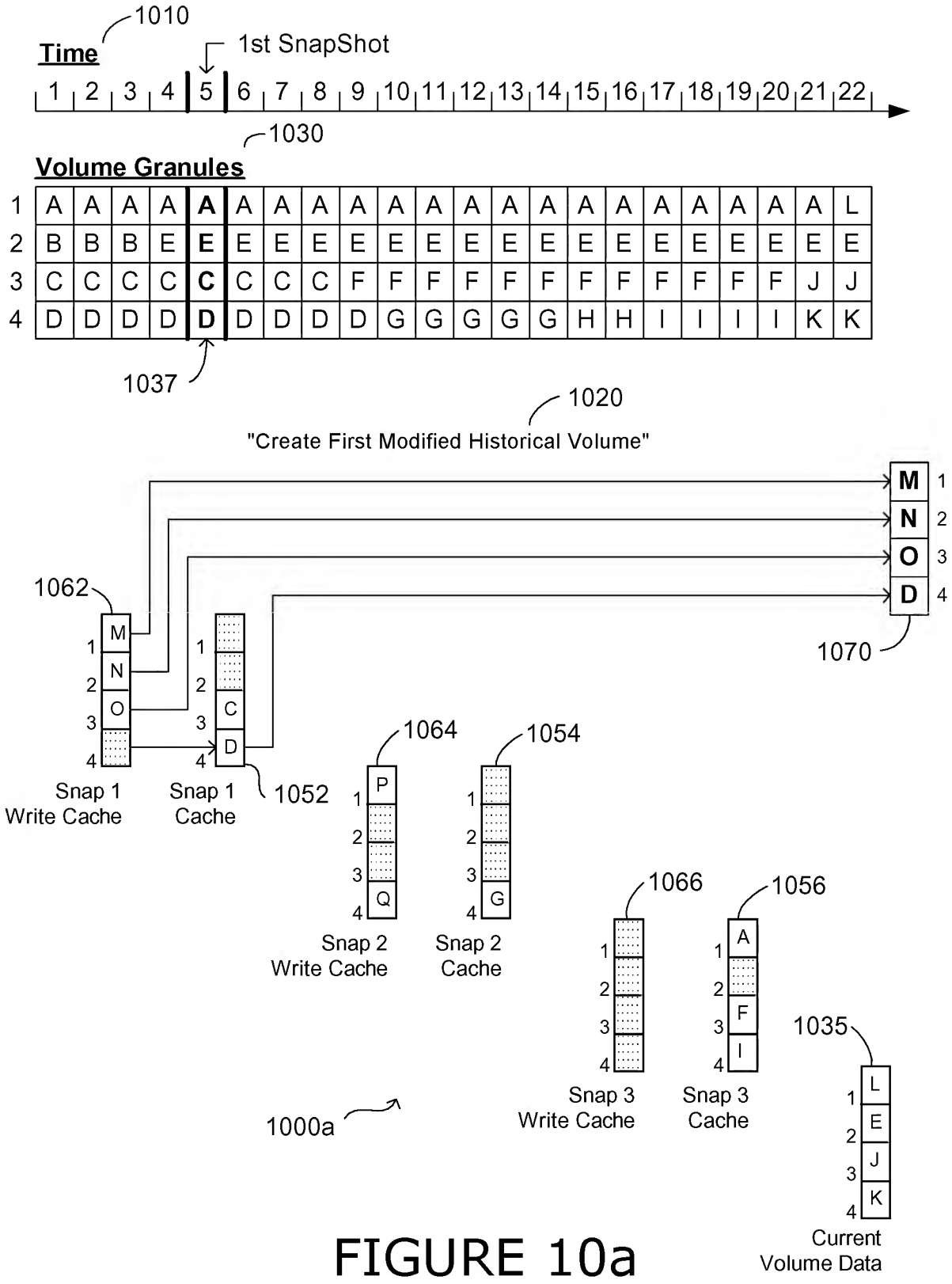

1010
Time
1st SnapShot
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
1030
Volume Granules
1 A A A A A A A A A A A A A A A A A A A A A A L
2 B B B E E E E E E E E E E E E E E E E E E E E
3 C C C C C C C C F F F F F F F F F F F F F J J
4 D D D D D D D D D G G G G G H H I I I I K K
1037
1020
"Create First Modified Historical Volume"
M 1
N 2
O 3
D 4
1070
1062
Snap 1 Write Cache
Snap 1 Cache
1052
1064
Snap 2 Write Cache
1054
Snap 2 Cache
1066
Snap 3 Write Cache
1056
Snap 3 Cache
1035
Current Volume Data
1000a

FIGURE 10a

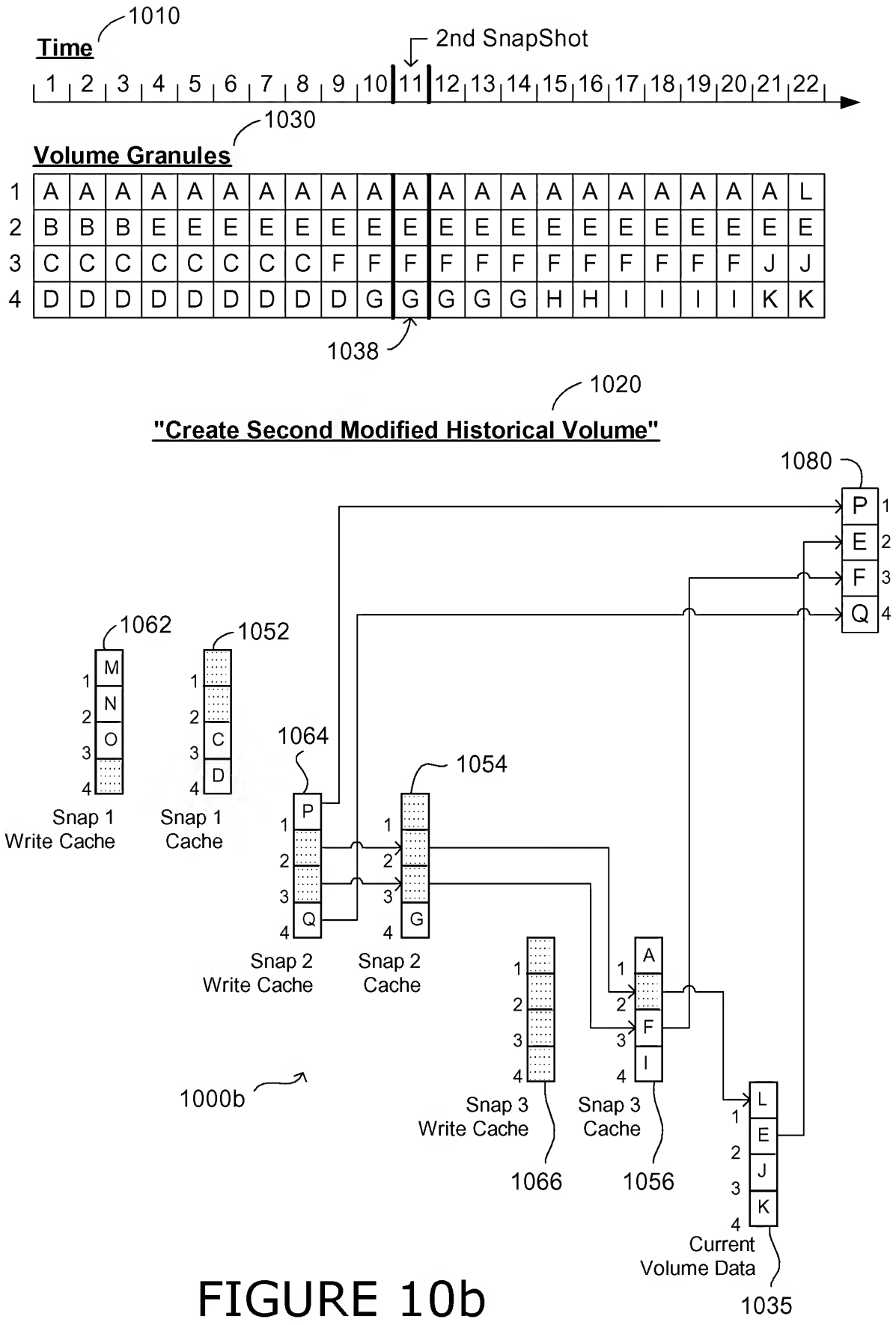

1010
Time
2nd SnapShot
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
1030
Volume Granules
1 A A A A A A A A A A A A A A A A A A A A A L
2 B B B E E E E E E E E E E E E E E E E E E E
3 C C C C C C C C F F F F F F F F F F F F J J
4 D D D D D D D D D G G G G G H H I I I I K K
1038
1020
"Create Second Modified Historical Volume"
1080
P 1
E 2
F 3
Q 4
1062
1052
1064
1054
M
N
O
C
D
P
Q
G
Snap 1 Write Cache
Snap 1 Cache
Snap 2 Write Cache
Snap 2 Cache
A
F
I
L
E
J
K
Snap 3 Write Cache
Snap 3 Cache
1066
1056
Current Volume Data
1035
1000b

FIGURE 10b

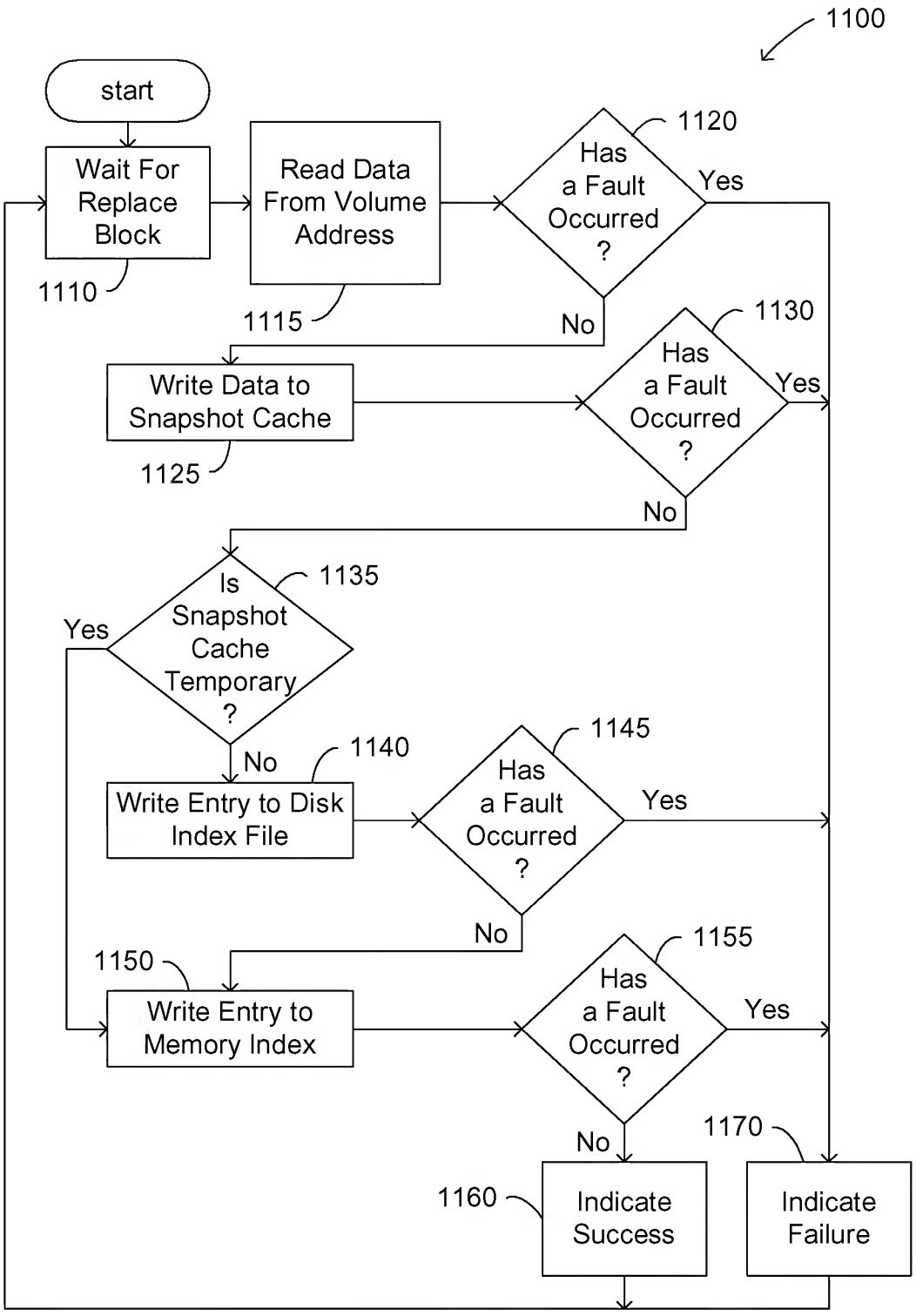

1100
start
Wait For Replace Block
1110
Read Data From Volume Address
1115
Has a Fault Occurred ?
1120
Yes
No
Write Data to Snapshot Cache
1125
Has a Fault Occurred ?
1130
Yes
No
Is Snapshot Cache Temporary ?
1135
Yes
No
Write Entry to Disk Index File
1140
Has a Fault Occurred ?
1145
Yes
No
Write Entry to Memory Index
1150
Has a Fault Occurred ?
1155
Yes
No
Indicate Success
1160
Indicate Failure
1170

FIGURE 11

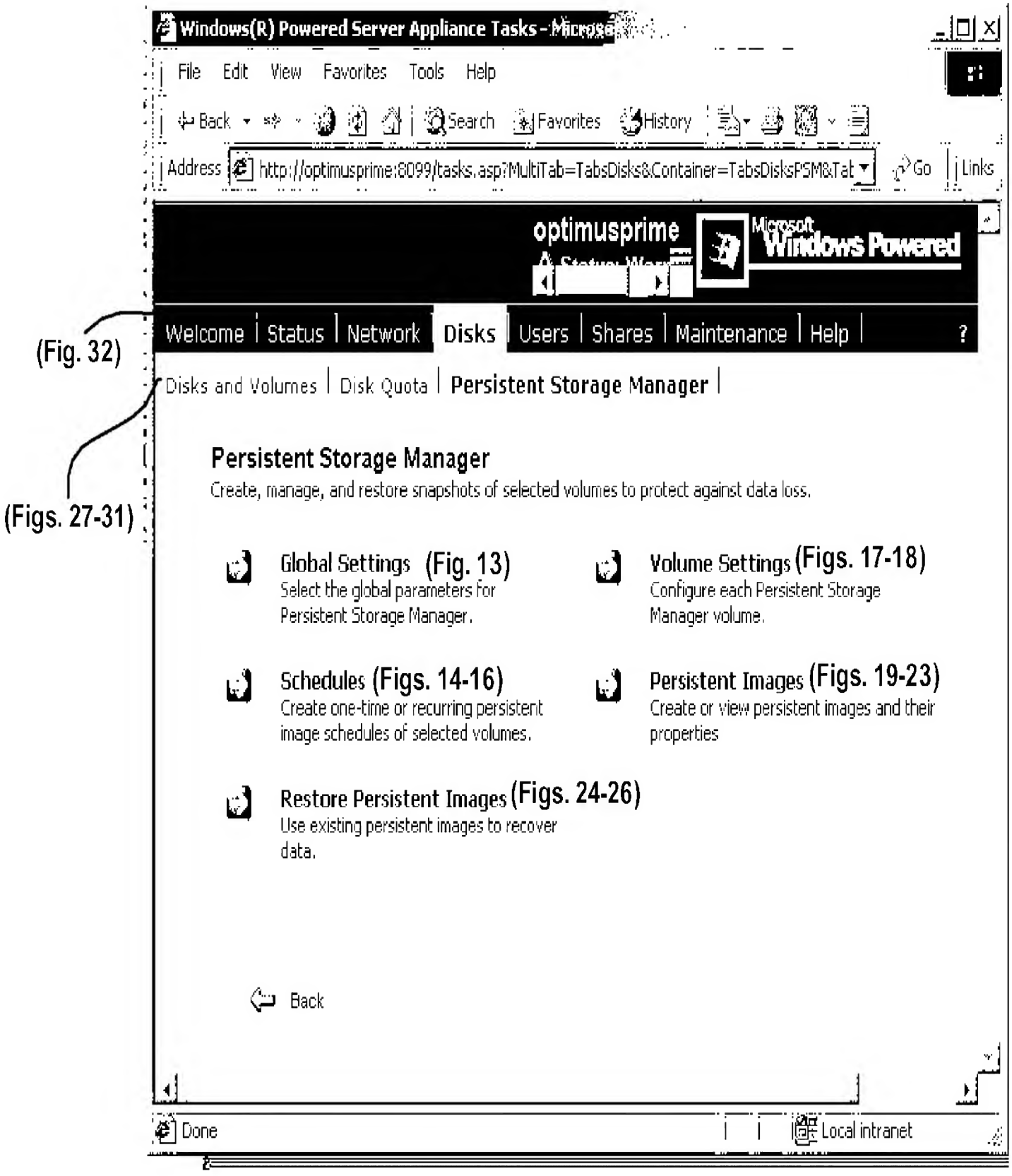

Windows(R) Powered Server Appliance Tasks - Microsoft
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/tasks.asp?MultiTab=TabsDisks&Container=TabsDisksPSM&Tat
Go Links
optimusprime
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Persistent Storage Manager
Create, manage, and restore snapshots of selected volumes to protect against data loss.
Global Settings (Fig. 13)
Select the global parameters for Persistent Storage Manager.
Volume Settings (Figs. 17-18)
Configure each Persistent Storage Manager volume.
Schedules (Figs. 14-16)
Create one-time or recurring persistent image schedules of selected volumes.
Persistent Images (Figs. 19-23)
Create or view persistent images and their properties
Restore Persistent Images (Figs. 24-26)
Use existing persistent images to recover data.
Back
Done
Local intranet
(Fig. 32)
(Figs. 27-31)

FIGURE 12

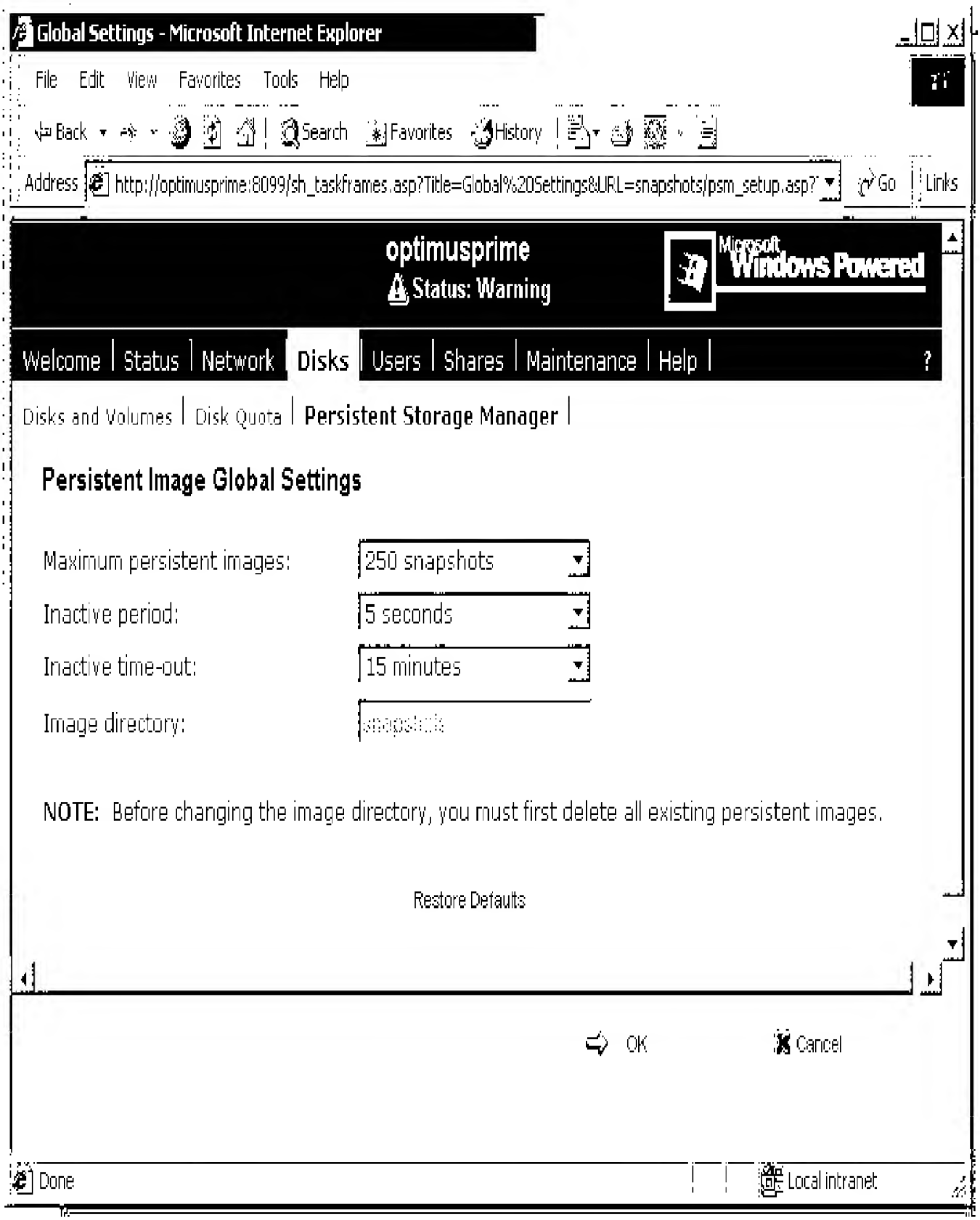

Global Settings - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/sh_taskframes.asp?Title=Global%20Settings&URL=snapshots/psm_setup.asp?
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Persistent Image Global Settings
Maximum persistent images: 250 snapshots
Inactive period: 5 seconds
Inactive time-out: 15 minutes
Image directory: snapshots
NOTE: Before changing the image directory, you must first delete all existing persistent images.
Restore Defaults
OK
Cancel
Done
Local intranet

FIGURE 13

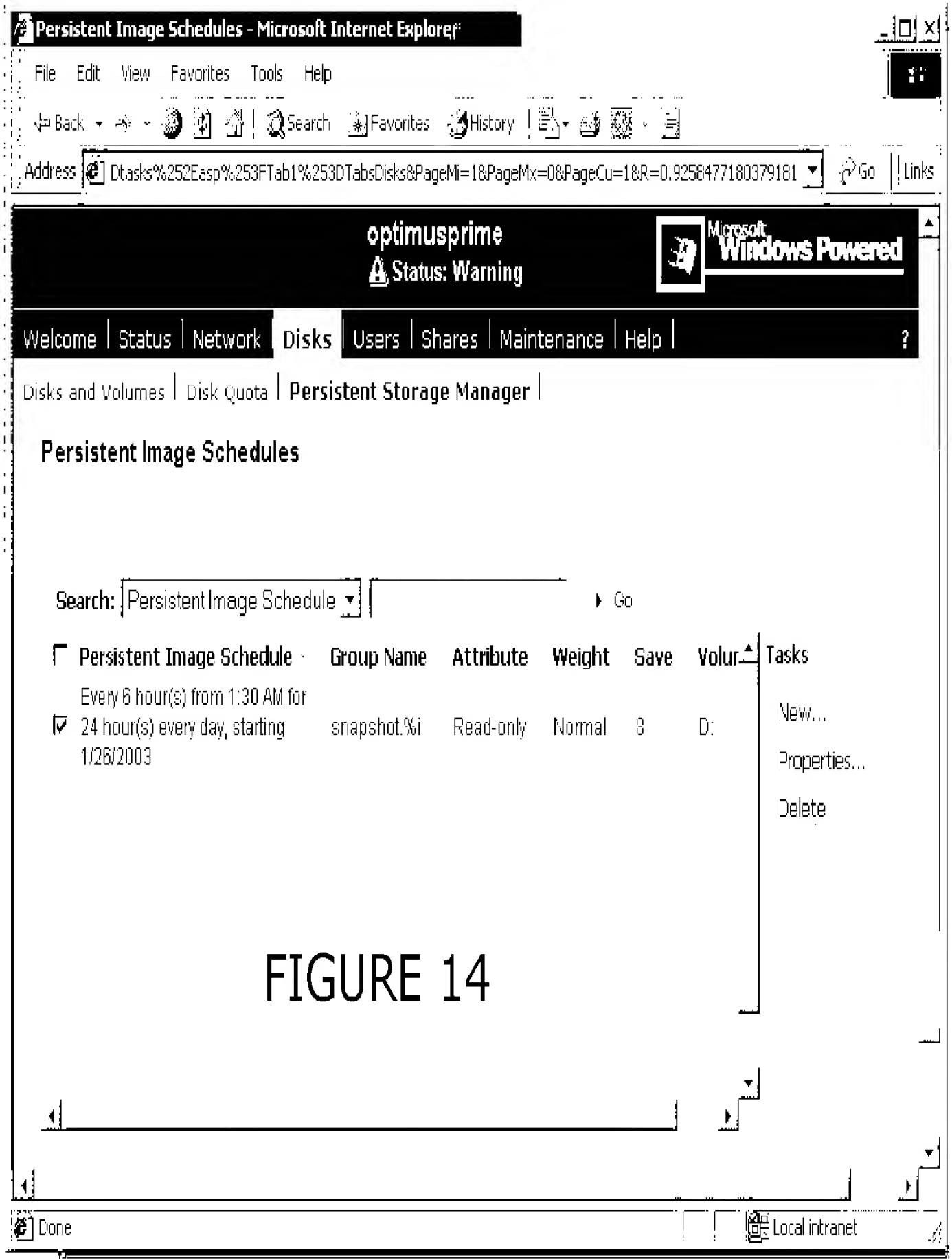

Persistent Image Schedules - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address Dtasks%252Easp%253FTab1%253DTabsDisks&PageMi=1&PageMx=0&PageCu=1&R=0.9258477180379181
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome Status Network Disks Users Shares Maintenance Help ?
Disks and Volumes Disk Quota Persistent Storage Manager
Persistent Image Schedules
Search: Persistent Image Schedule Go
Persistent Image Schedule Group Name Attribute Weight Save Volur
Every 6 hour(s) from 1:30 AM for 24 hour(s) every day, starting 1/26/2003 snapshot.%i Read-only Normal 8 D:
Tasks
New...
Properties...
Delete
Done
Local intranet

FIGURE 14

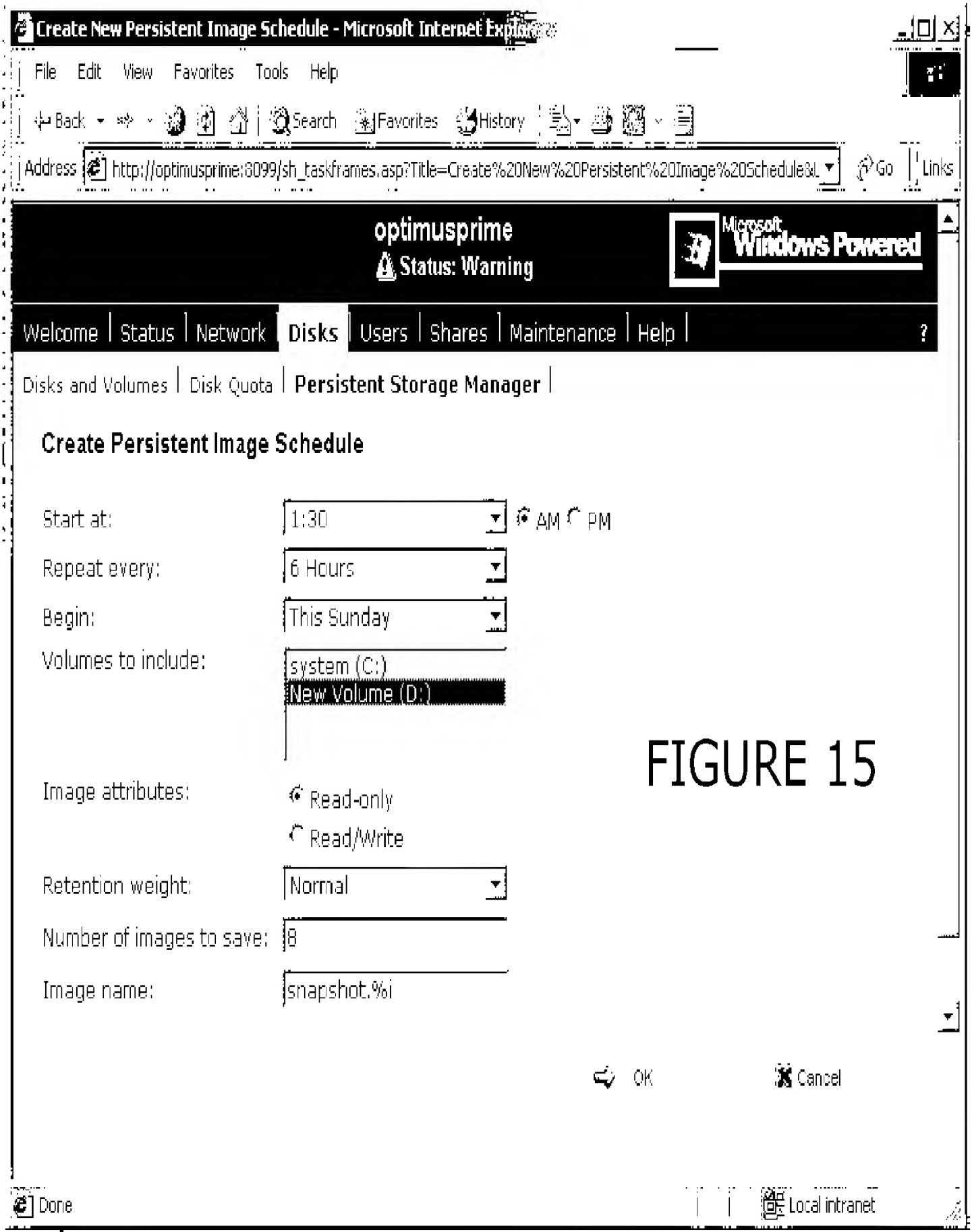

Create New Persistent Image Schedule - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/sh_taskframes.asp?Title=Create%20New%20Persistent%20Image%20Schedule&L
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Create Persistent Image Schedule
Start at: 1:30 AM PM
Repeat every: 6 Hours
Begin: This Sunday
Volumes to include: system (C:) New Volume (D:)
Image attributes: Read-only Read/Write
Retention weight: Normal
Number of images to save: 8
Image name: snapshot.%i
OK Cancel
Done
Local intranet

FIGURE 15

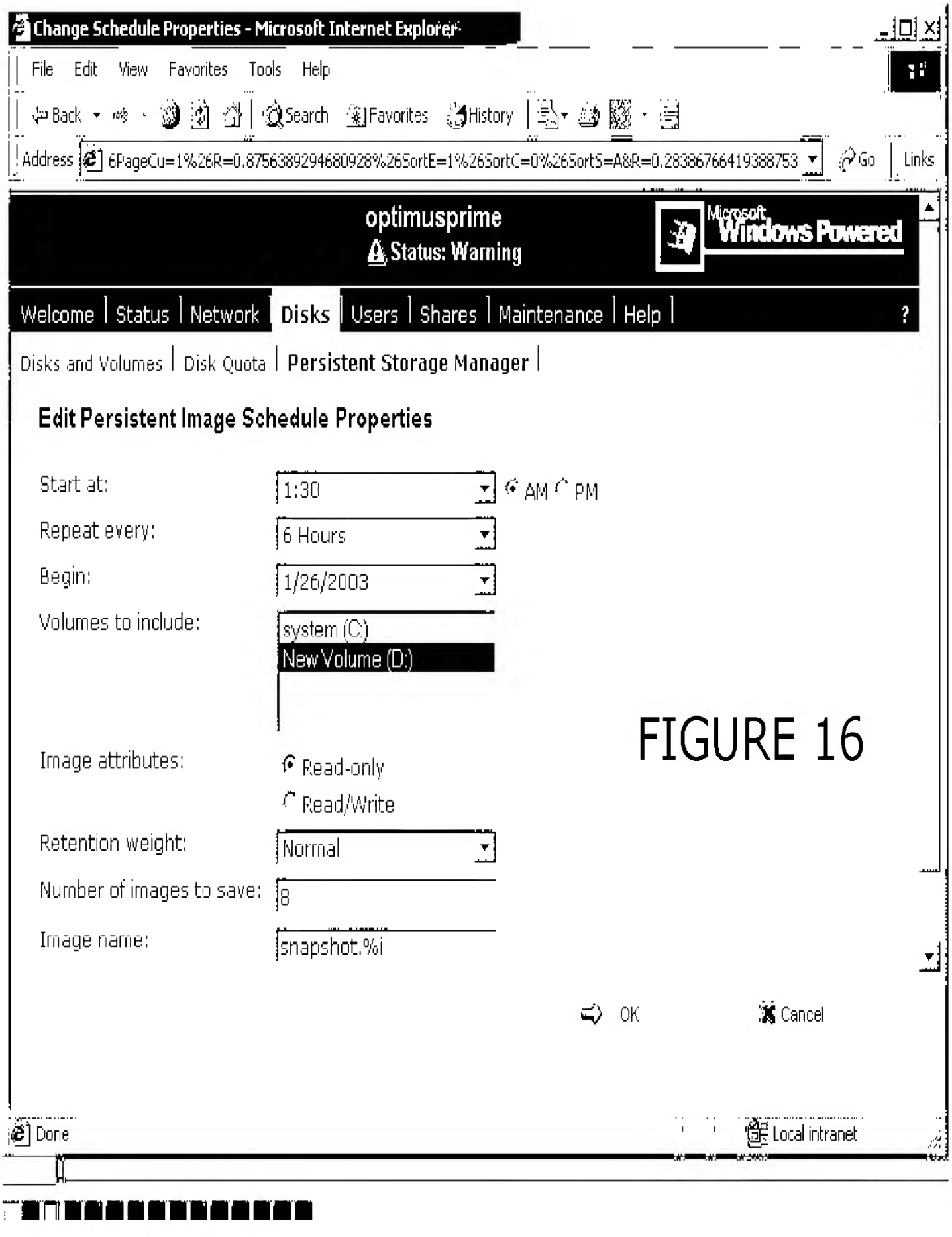

Change Schedule Properties - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address 6PageCu=1%26R=0.8756389294680928%26SortE=1%26SortC=0%26SortS=A&R=0.28386766419388753
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Edit Persistent Image Schedule Properties
Start at: 1:30 AM PM
Repeat every: 6 Hours
Begin: 1/26/2003
Volumes to include: system (C:) New Volume (D:)
Image attributes: Read-only Read/Write
Retention weight: Normal
Number of images to save: 8
Image name: snapshot.%i
OK
Cancel
Done
Local intranet

FIGURE 16

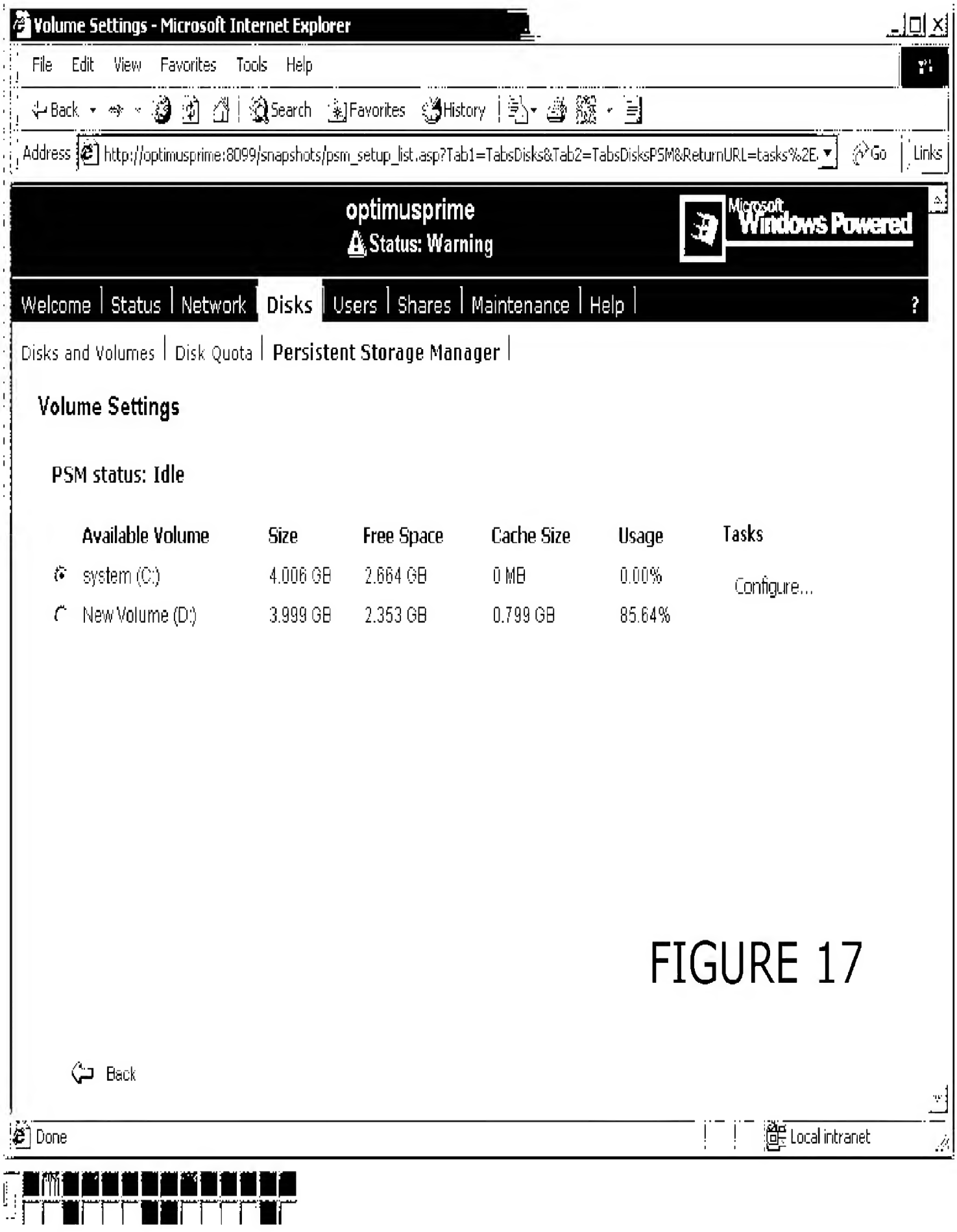

Volume Settings - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/snapshots/psm_setup_list.asp?Tab1=TabsDisks&Tab2=TabsDisksPSM&ReturnURL=tasks%2E
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help |
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Volume Settings
PSM status: Idle
Available Volume
Size
Free Space
Cache Size
Usage
Tasks
system (C:)
4.006 GB
2.664 GB
0 MB
0.00%
Configure...
New Volume (D:)
3.999 GB
2.353 GB
0.799 GB
85.64%
Back
Done
Local intranet

FIGURE 17

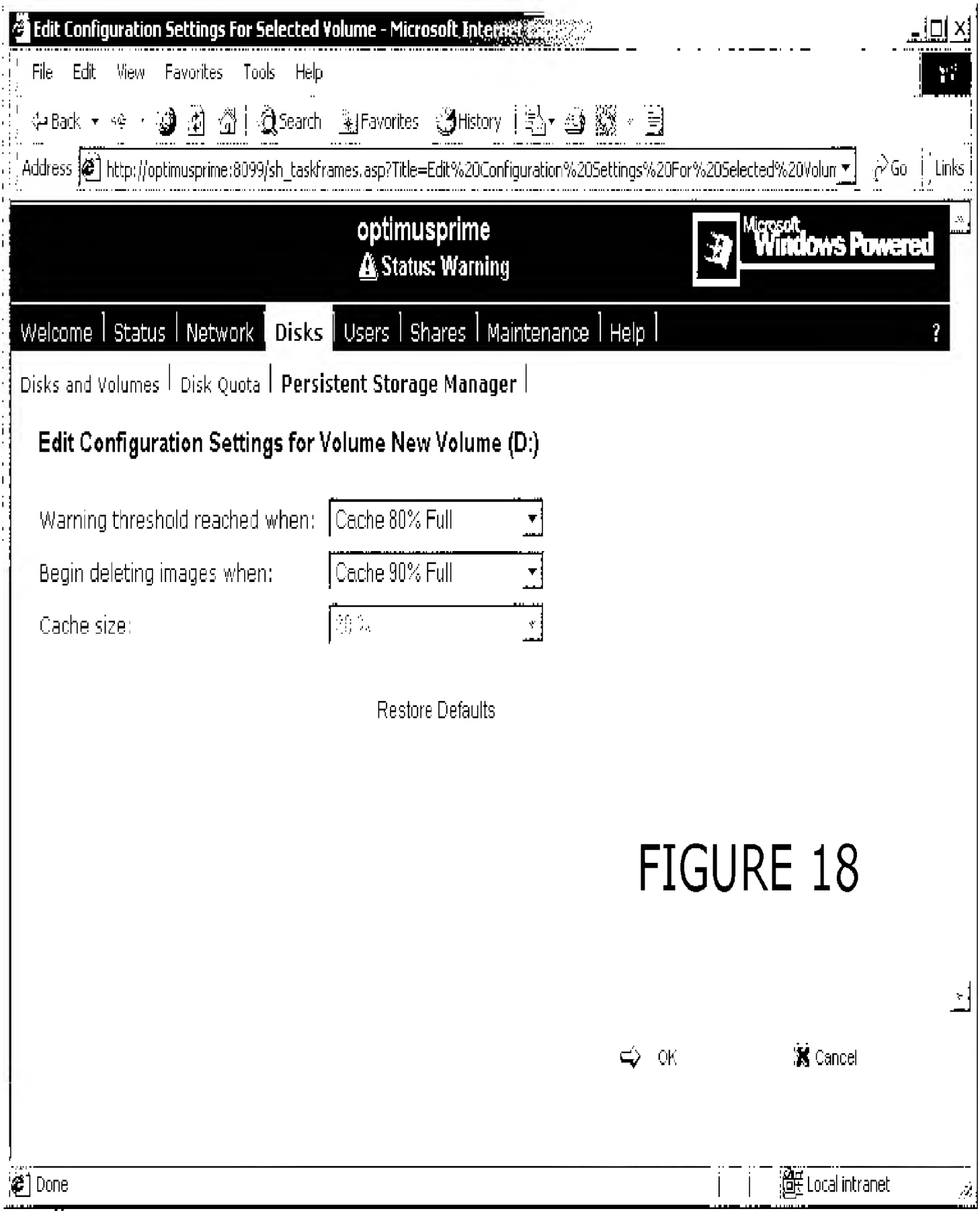

Edit Configuration Settings For Selected Volume - Microsoft Internet
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/sh_taskframes.asp?Title=Edit%20Configuration%20Settings%20For%20Selected%20Volum
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Edit Configuration Settings for Volume New Volume (D:)
Warning threshold reached when: Cache 80% Full
Begin deleting images when: Cache 90% Full
Cache size:
Restore Defaults
OK
Cancel
Done
Local intranet

FIGURE 18

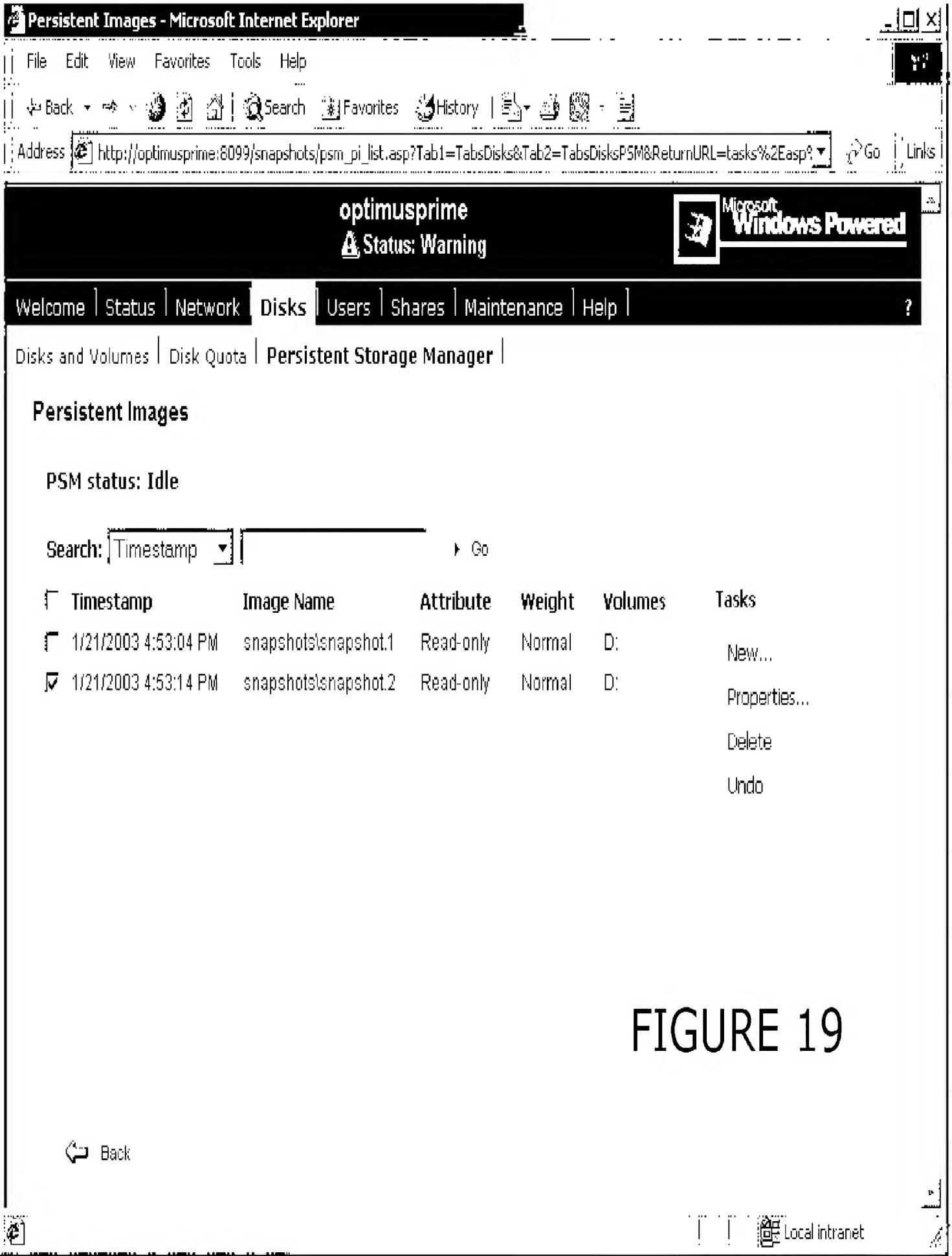

Persistent Images - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/snapshots/psm_pi_list.asp?Tab1=TabsDisks&Tab2=TabsDisksPSM&ReturnURL=tasks%2Easp?
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager
Persistent Images
PSM status: Idle
Search: Timestamp
Go
Timestamp
Image Name
Attribute
Weight
Volumes
Tasks
1/21/2003 4:53:04 PM
snapshots\snapshot.1
Read-only
Normal
D:
1/21/2003 4:53:14 PM
snapshots\snapshot.2
Read-only
Normal
D:
New...
Properties...
Delete
Undo
Back
Local intranet

FIGURE 19

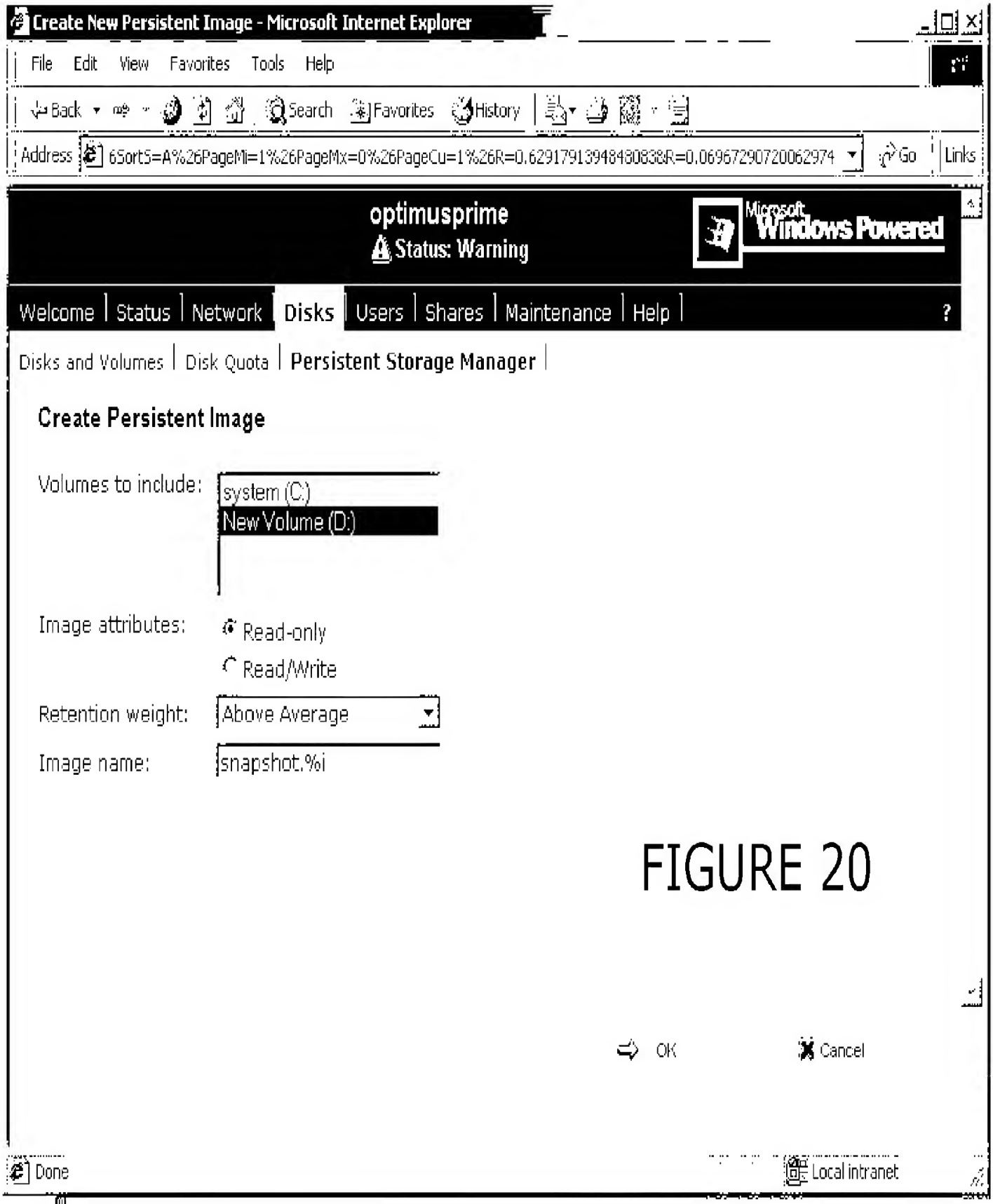

Create New Persistent Image - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address 6SortS=A%26PageMi=1%26PageMx=0%26PageCu=1%26R=0.6291791394848083&R=0.06967290720062974
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager
Create Persistent Image
Volumes to include:
system (C:)
New Volume (D:)
Image attributes:
Read-only
Read/Write
Retention weight:
Above Average
Image name:
snapshot.%i
OK
Cancel
Done
Local intranet

FIGURE 20

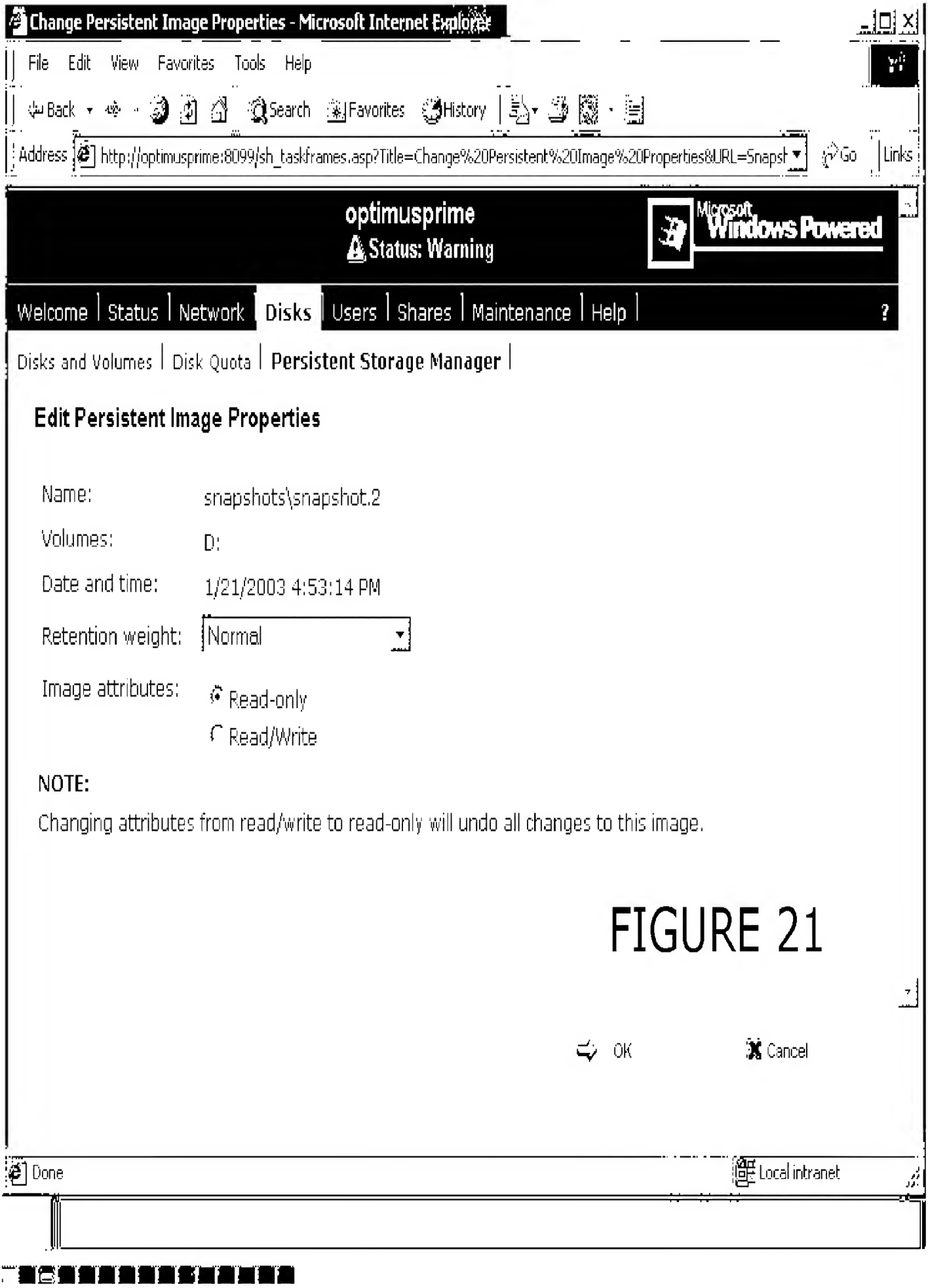

Change Persistent Image Properties - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/sh_taskframes.asp?Title=Change%20Persistent%20Image%20Properties&URL=Snapst
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Edit Persistent Image Properties
Name: snapshots\snapshot.2
Volumes: D:
Date and time: 1/21/2003 4:53:14 PM
Retention weight: Normal
Image attributes: Read-only Read/Write
NOTE:
Changing attributes from read/write to read-only will undo all changes to this image.
OK
Cancel
Done
Local intranet

FIGURE 21

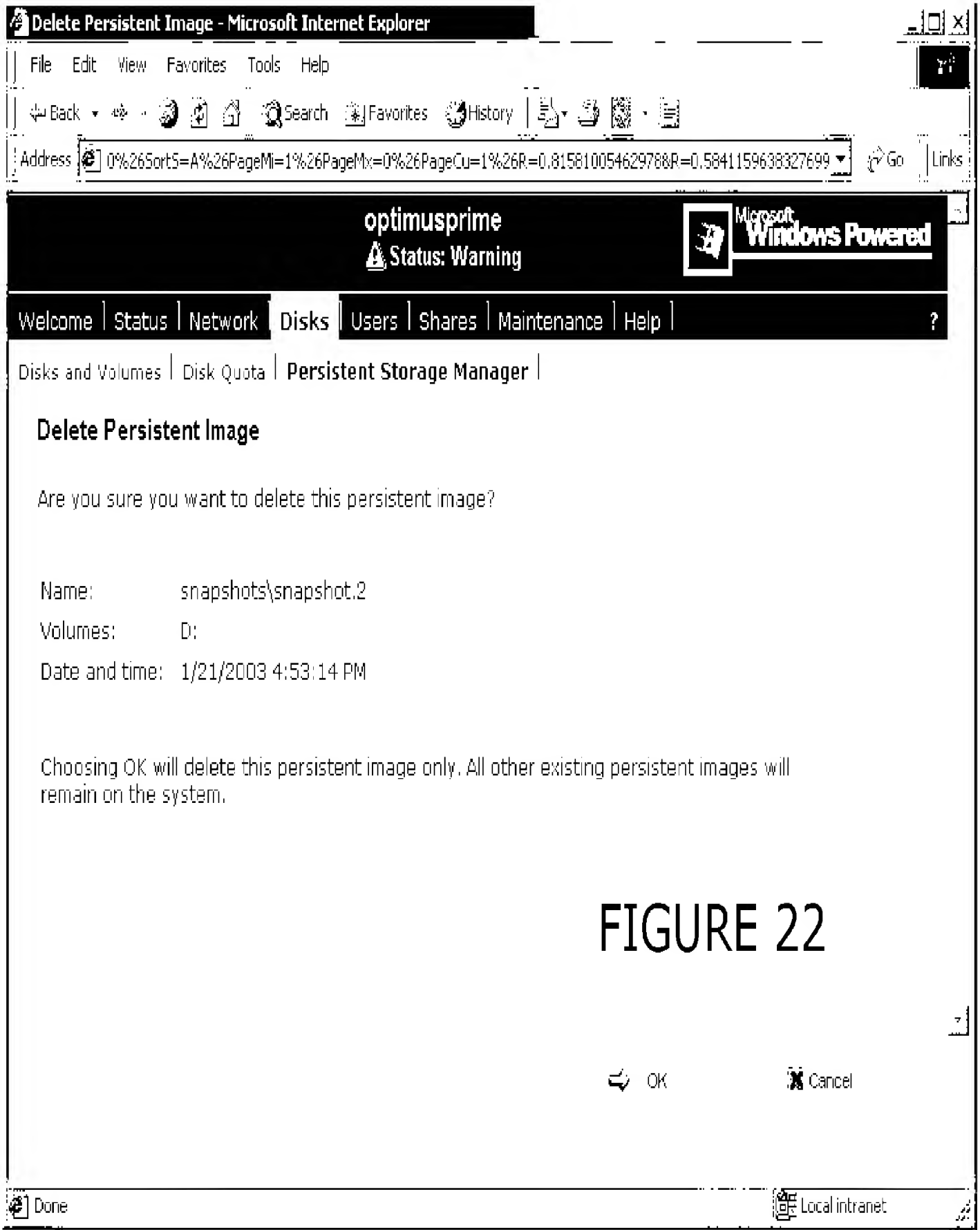

Delete Persistent Image - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address 0%26Sort5=A%26PageMi=1%26PageMx=0%26PageCu=1%26R=0.8158100546297 8&R=0.5841159638327699
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Delete Persistent Image
Are you sure you want to delete this persistent image?
Name: snapshots\snapshot.2
Volumes: D:
Date and time: 1/21/2003 4:53:14 PM
Choosing OK will delete this persistent image only. All other existing persistent images will remain on the system.
OK
Cancel
Done
Local intranet

FIGURE 22

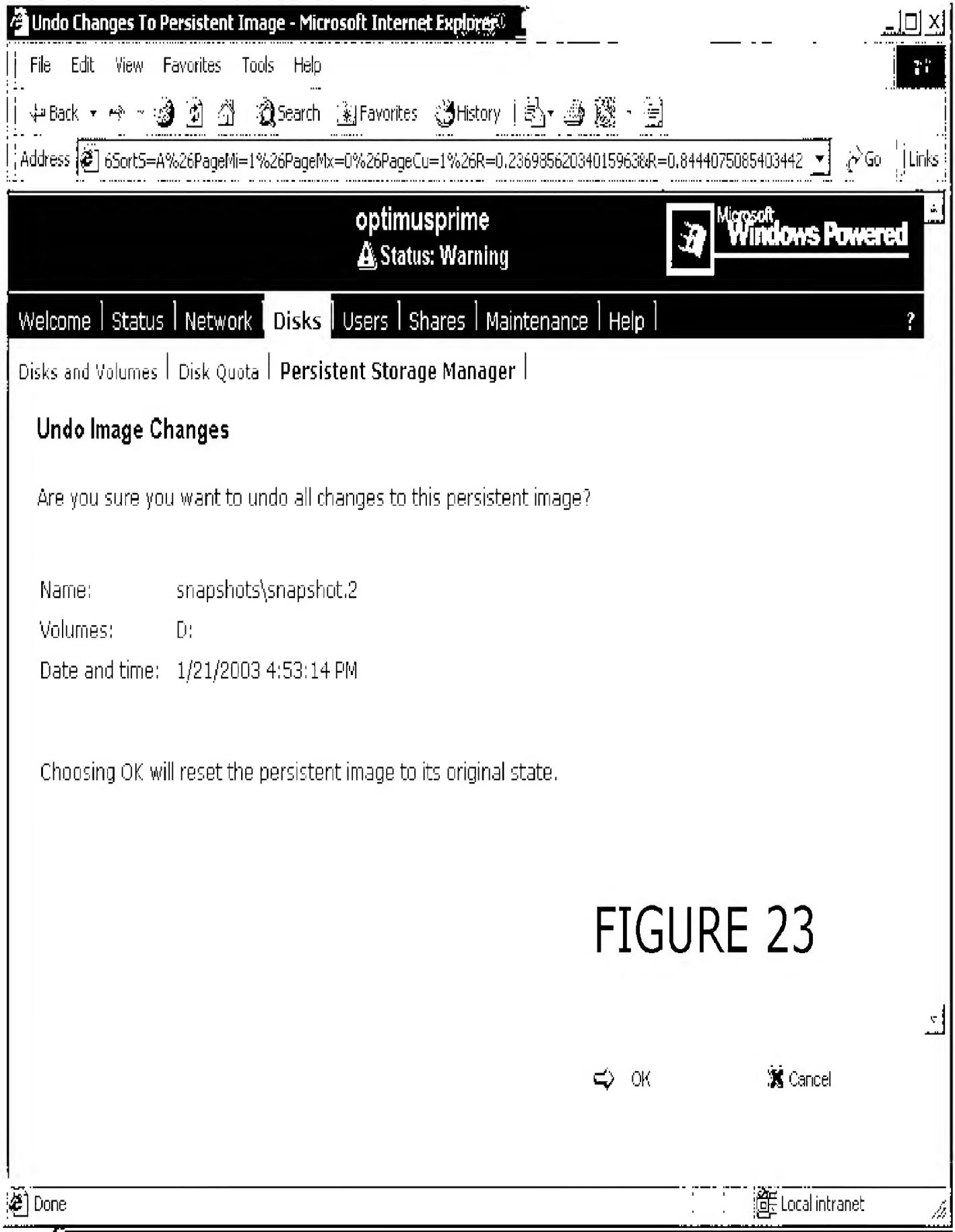

Undo Changes To Persistent Image - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address 6SortS=A%26PageMi=1%26PageMx=0%26PageCu=1%26R=0.2369856203401596388R=0.8444075085403442
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Undo Image Changes
Are you sure you want to undo all changes to this persistent image?
Name: snapshots\snapshot.2
Volumes: D:
Date and time: 1/21/2003 4:53:14 PM
Choosing OK will reset the persistent image to its original state.
OK
Cancel
Done
Local intranet

FIGURE 23

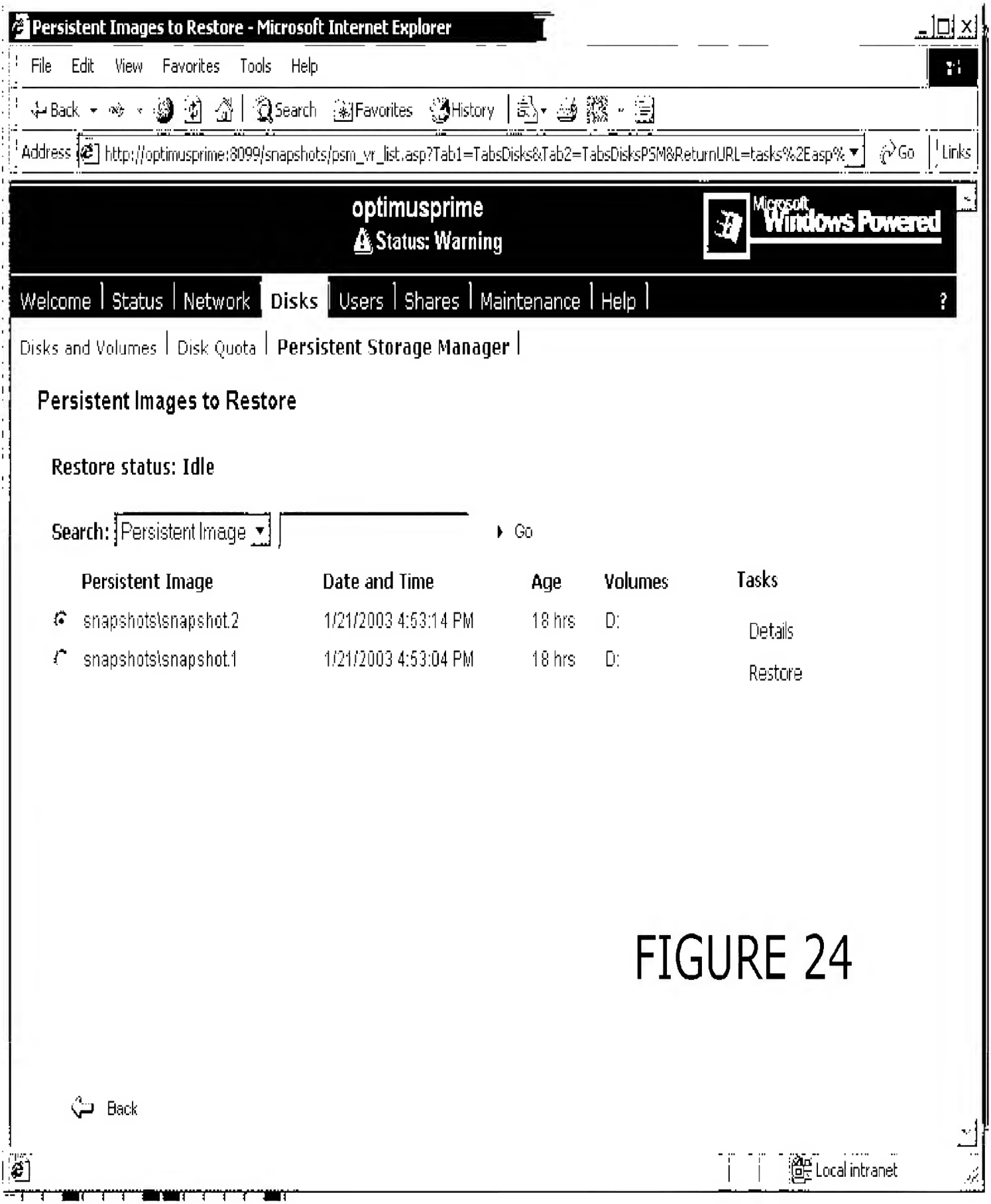

Persistent Images to Restore - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/snapshots/psm_vr_list.asp?Tab1=TabsDisks&Tab2=TabsDisksPSM&ReturnURL=tasks%2Easp%
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Persistent Images to Restore
Restore status: Idle
Search: Persistent Image Go
Persistent Image
Date and Time
Age
Volumes
Tasks
snapshots\snapshot.2
1/21/2003 4:53:14 PM
18 hrs
D:
Details
snapshots\snapshot.1
1/21/2003 4:53:04 PM
18 hrs
D:
Restore
Back
Local intranet
Help, click Help Topics on the Help Menu.

FIGURE 24

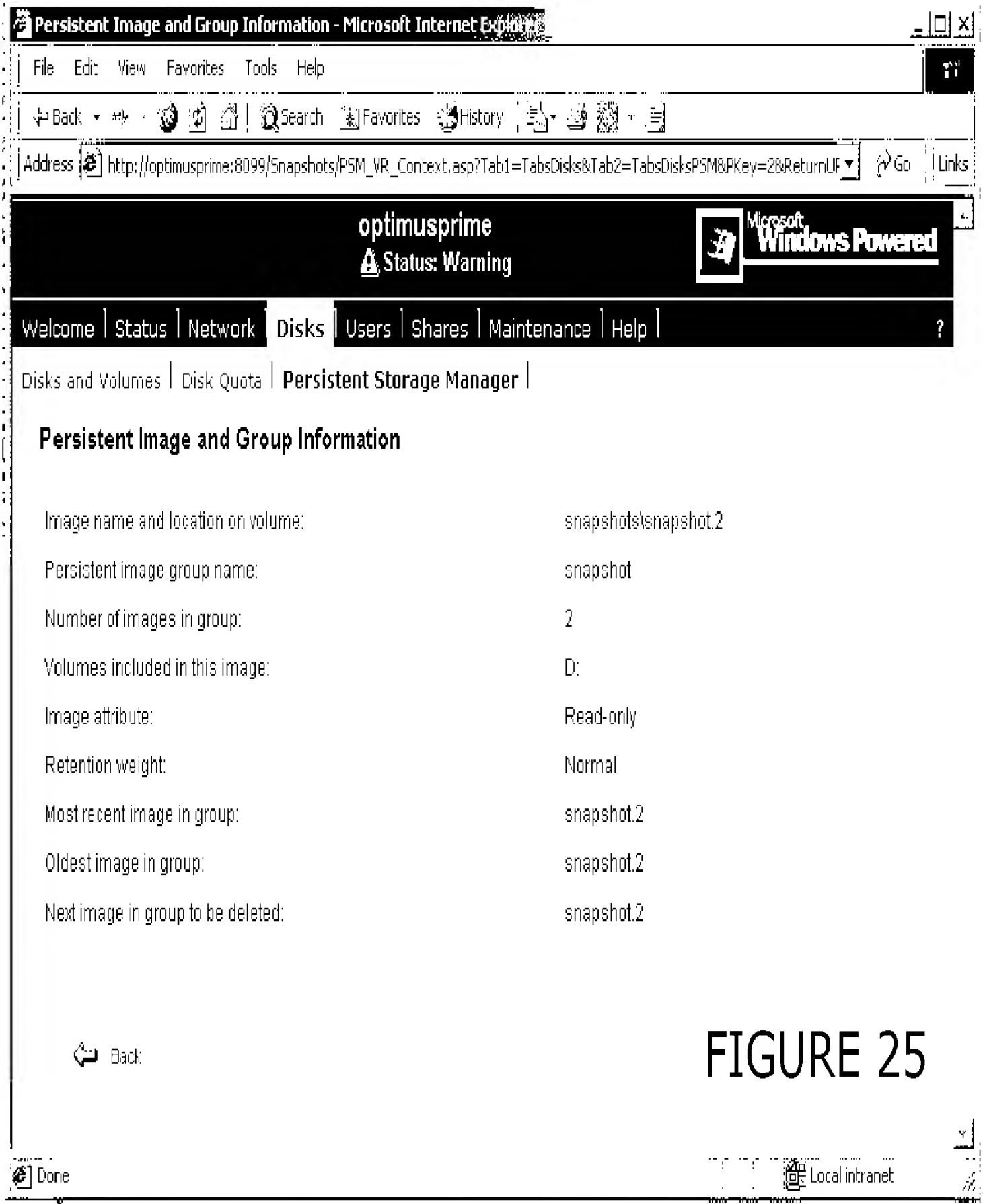

Persistent Image and Group Information - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/Snapshots/PSM_VR_Context.asp?Tab1=TabsDisks&Tab2=TabsDisksPSM&PKey=28&ReturnUR
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Persistent Image and Group Information
Image name and location on volume: snapshots\snapshot.2
Persistent image group name: snapshot
Number of images in group: 2
Volumes included in this image: D:
Image attribute: Read-only
Retention weight: Normal
Most recent image in group: snapshot.2
Oldest image in group: snapshot.2
Next image in group to be deleted: snapshot.2
Back
Done
Local intranet

FIGURE 25

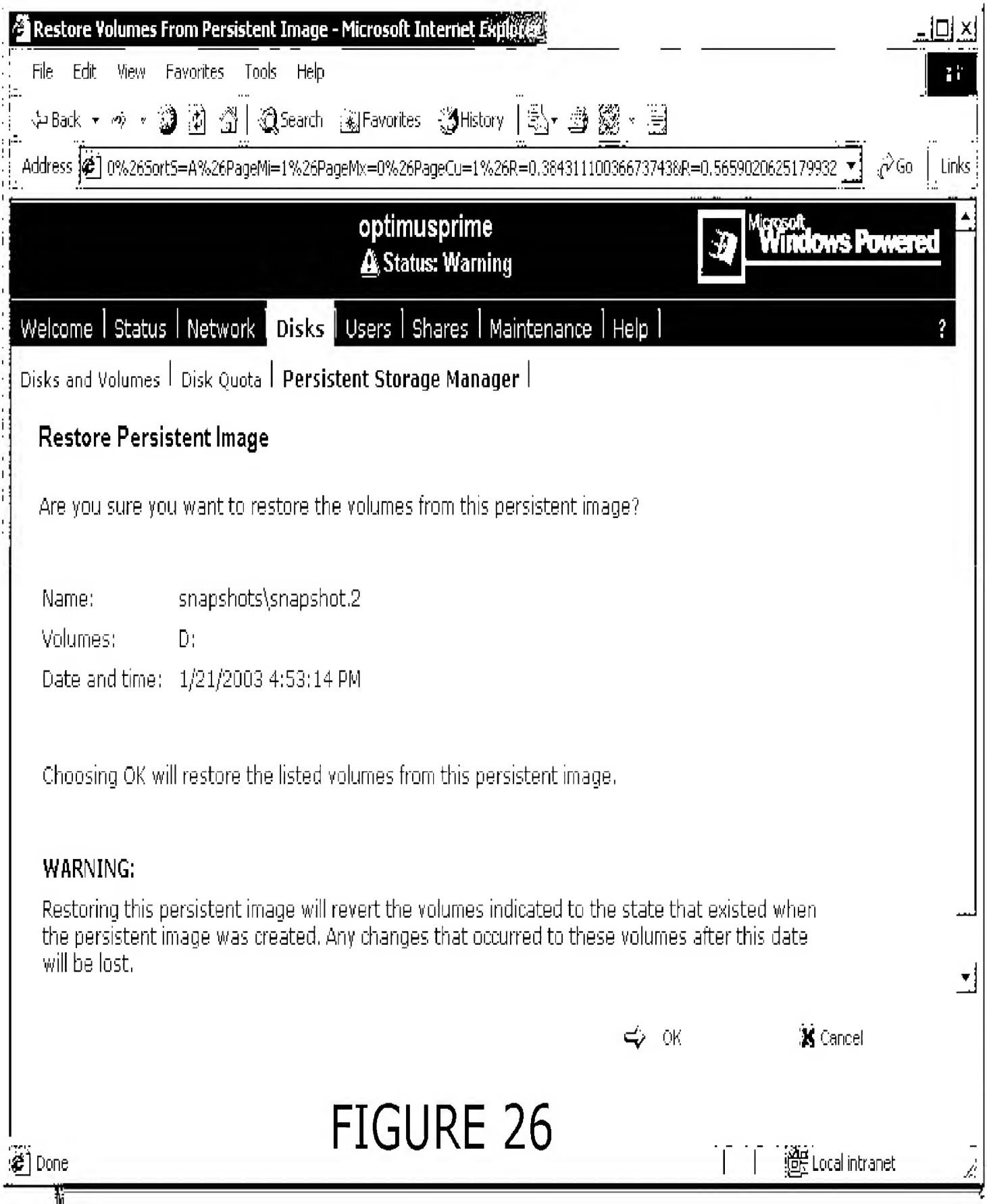

Restore Volumes From Persistent Image - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address 0%26SortS=A%26PageMi=1%26PageMx=0%26PageCu=1%26R=0.38431110036673743&R=0.5659020625179932
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Restore Persistent Image
Are you sure you want to restore the volumes from this persistent image?
Name: snapshots\snapshot.2
Volumes: D:
Date and time: 1/21/2003 4:53:14 PM
Choosing OK will restore the listed volumes from this persistent image.
WARNING:
Restoring this persistent image will revert the volumes indicated to the state that existed when the persistent image was created. Any changes that occurred to these volumes after this date will be lost.
OK
Cancel
Done
Local intranet

FIGURE 26

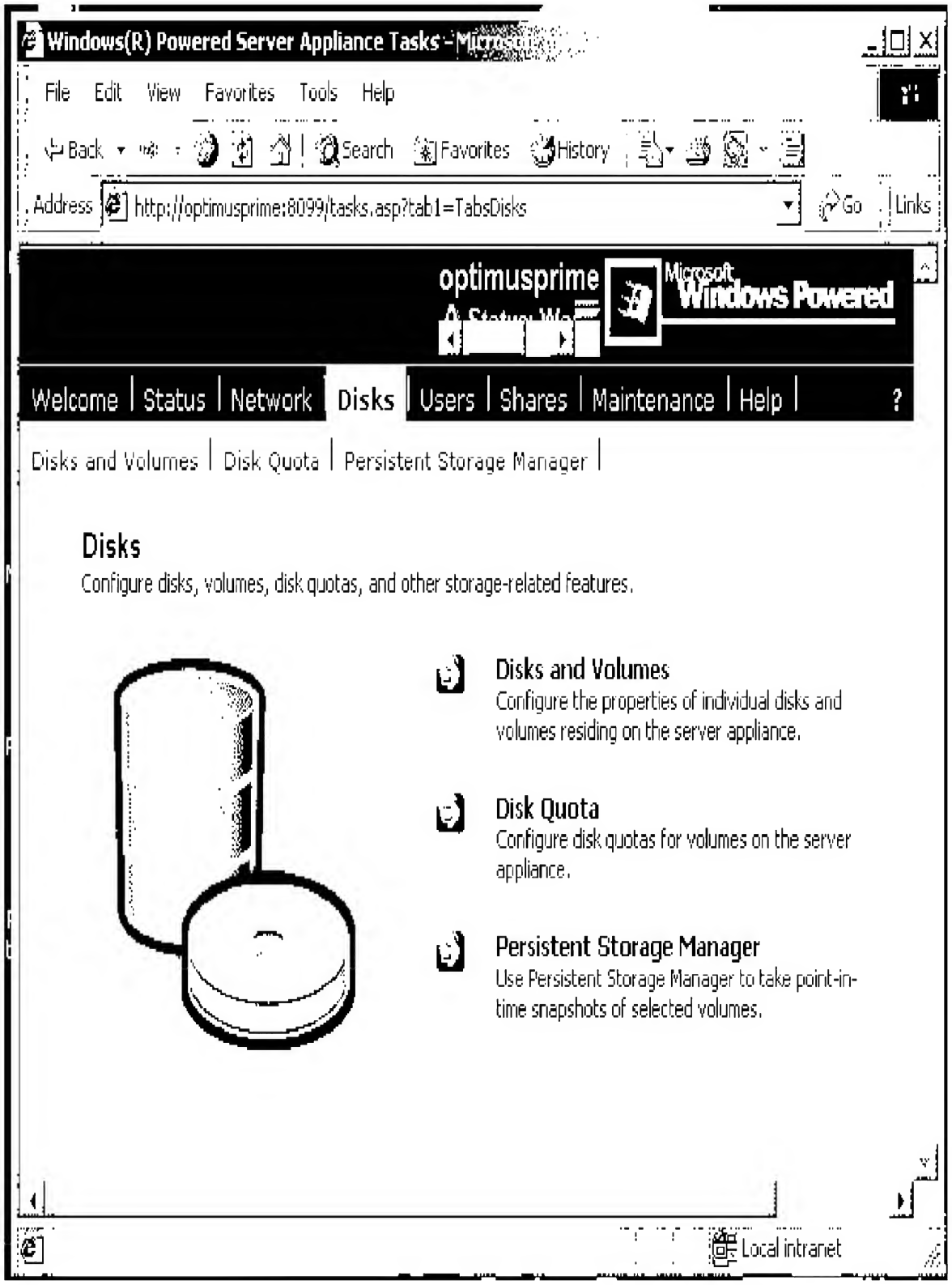

Windows(R) Powered Server Appliance Tasks - Microsoft
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/tasks.asp?tab1=TabsDisks
Go Links
optimusprime
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Disks
Configure disks, volumes, disk quotas, and other storage-related features.
Disks and Volumes
Configure the properties of individual disks and volumes residing on the server appliance.
Disk Quota
Configure disk quotas for volumes on the server appliance.
Persistent Storage Manager
Use Persistent Storage Manager to take point-in-time snapshots of selected volumes.
Local intranet

FIGURE 27

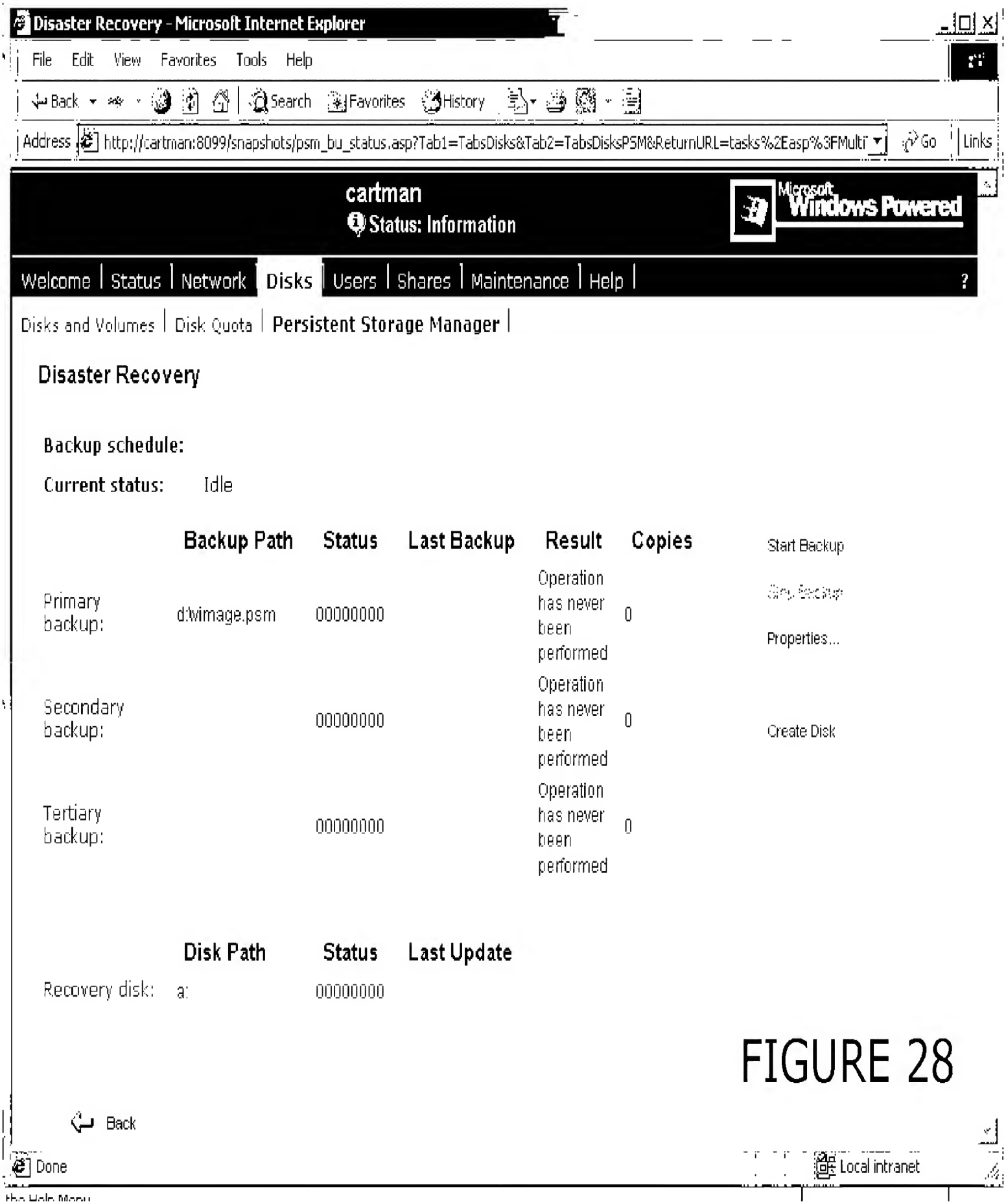

Disaster Recovery - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://cartman:8099/snapshots/psm_bu_status.asp?Tab1=TabsDisks&Tab2=TabsDisksPSM&ReturnURL=tasks%2Easp%3FMulti Go Links
cartman
Status: Information
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Disaster Recovery
Backup schedule:
Current status: Idle
Backup Path Status Last Backup Result Copies
Start Backup
Primary backup: d:\wimage.psm 00000000 Operation has never been performed 0
Properties...
Secondary backup: 00000000 Operation has never been performed 0 Create Disk
Tertiary backup: 00000000 Operation has never been performed 0
Disk Path Status Last Update
Recovery disk: a: 00000000
Back
Done
Local intranet

FIGURE 28

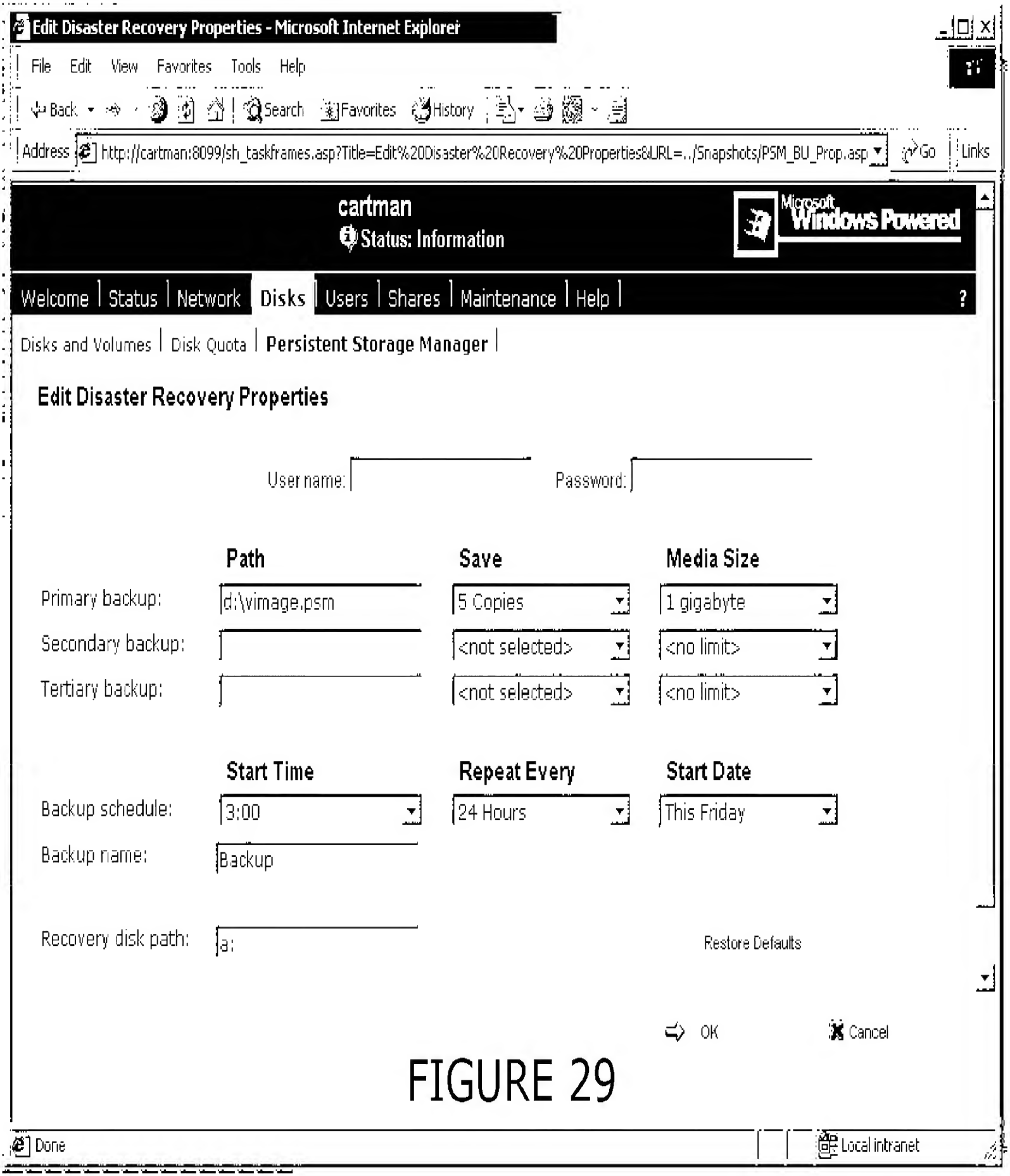

Edit Disaster Recovery Properties - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://cartman:8099/sh_taskframes.asp?Title=Edit%20Disaster%20Recovery%20Properties&URL=../Snapshots/PSM_BU_Prop.asp
Go Links
cartman
Status: Information
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help | ?
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Edit Disaster Recovery Properties
User name:
Password:
Path
Save
Media Size
Primary backup:
d:\vimage.psm
5 Copies
1 gigabyte
Secondary backup:
<not selected>
<no limit>
Tertiary backup:
<not selected>
<no limit>
Start Time
Repeat Every
Start Date
Backup schedule:
3:00
24 Hours
This Friday
Backup name:
Backup
Recovery disk path:
a:
Restore Defaults
OK
Cancel
Done
Local intranet

FIGURE 29

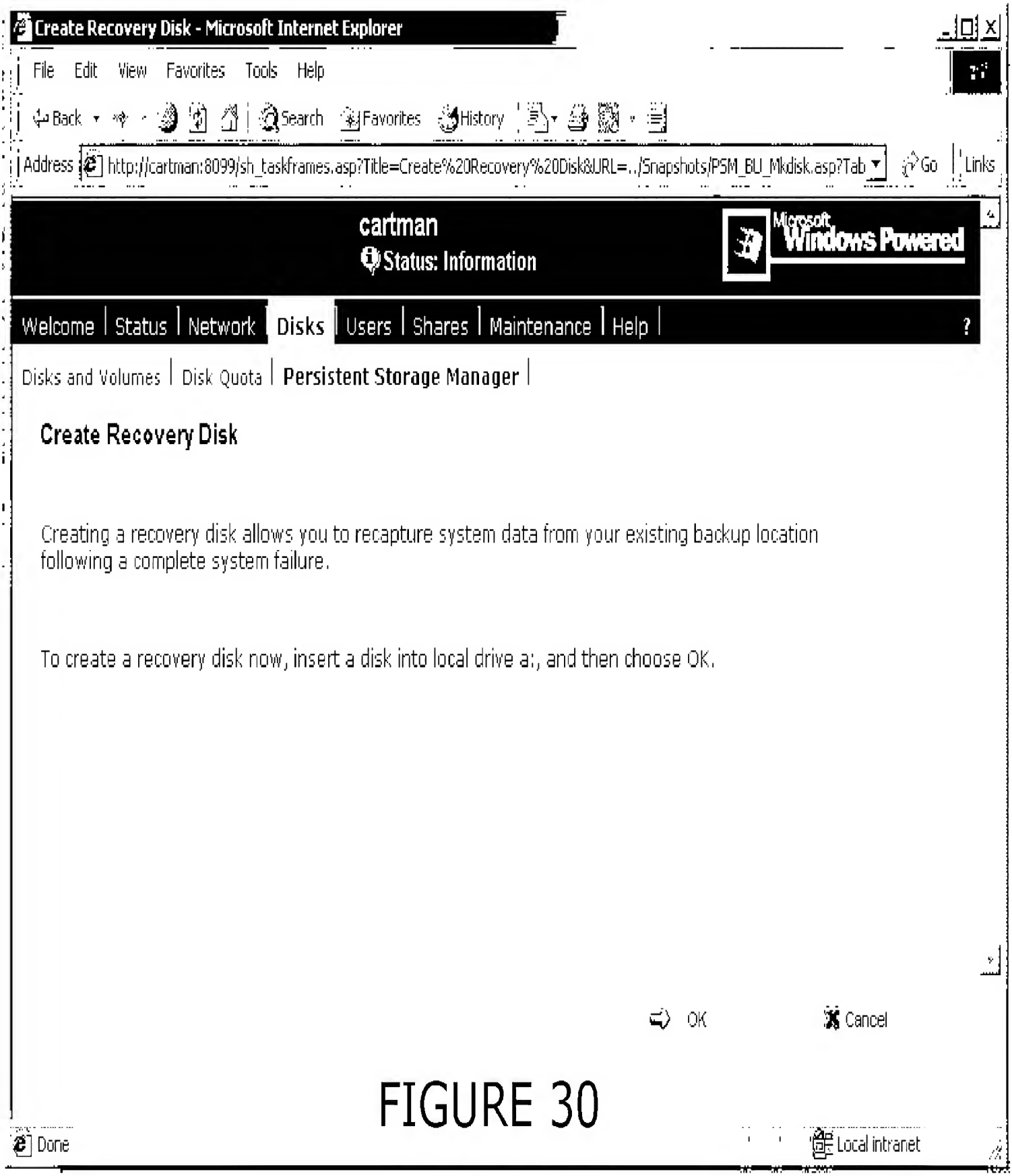

Create Recovery Disk - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://cartman:8099/sh_taskframes.asp?Title=Create%20Recovery%20Disk&URL=../Snapshots/PSM_BU_Mkdisk.asp?Tab
Go Links
cartman
Status: Information
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help |
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Create Recovery Disk
Creating a recovery disk allows you to recapture system data from your existing backup location following a complete system failure.
To create a recovery disk now, insert a disk into local drive a:, and then choose OK.
OK
Cancel
Done
Local intranet

FIGURE 30

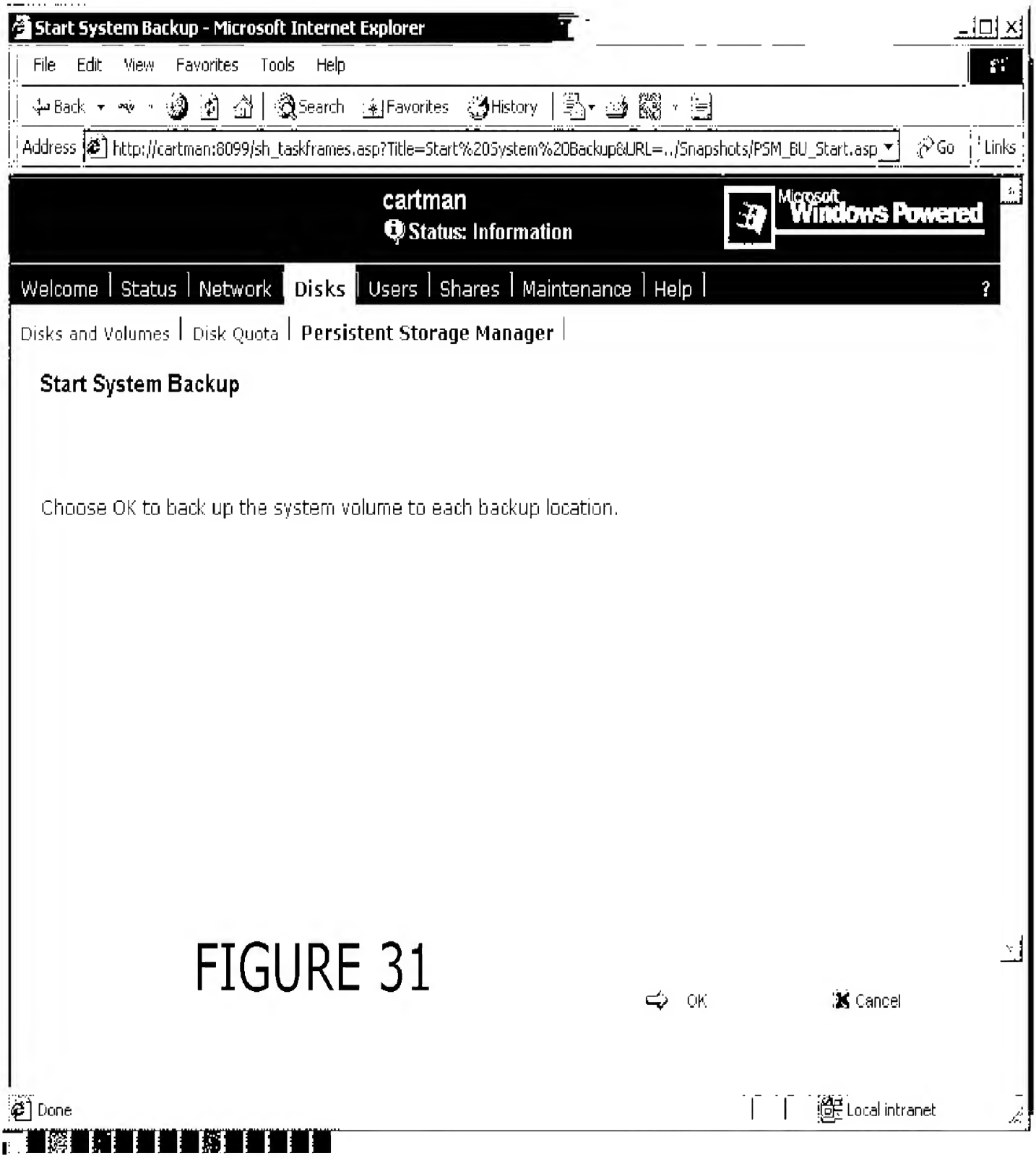

Start System Backup - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://cartman:8099/sh_taskframes.asp?Title=Start%20System%20Backup&URL=../Snapshots/PSM_BU_Start.asp
Go Links
cartman
Status: Information
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help |
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Start System Backup
Choose OK to back up the system volume to each backup location.
OK
Cancel
Done
Local intranet

FIGURE 31

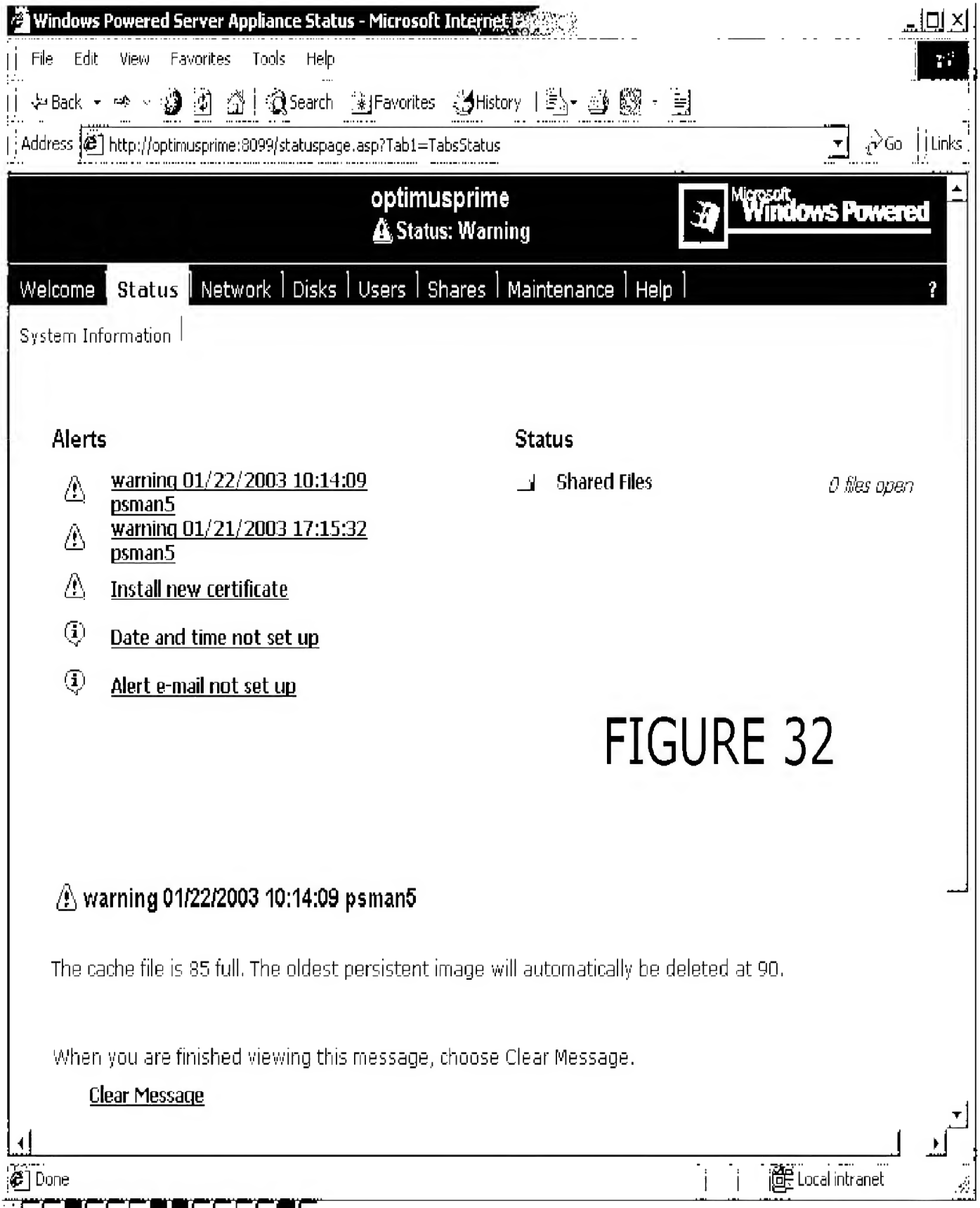

Windows Powered Server Appliance Status - Microsoft Internet
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://optimusprime:8099/statuspage.asp?Tab1=TabsStatus
Go Links
optimusprime
Status: Warning
Microsoft Windows Powered
Welcome Status Network Disks Users Shares Maintenance Help ?
System Information
Alerts
warning 01/22/2003 10:14:09 psman5
warning 01/21/2003 17:15:32 psman5
Install new certificate
Date and time not set up
Alert e-mail not set up
Status
Shared Files
0 files open
warning 01/22/2003 10:14:09 psman5
The cache file is 85 full. The oldest persistent image will automatically be deleted at 90.
When you are finished viewing this message, choose Clear Message.
Clear Message
Done
Local intranet

FIGURE 32

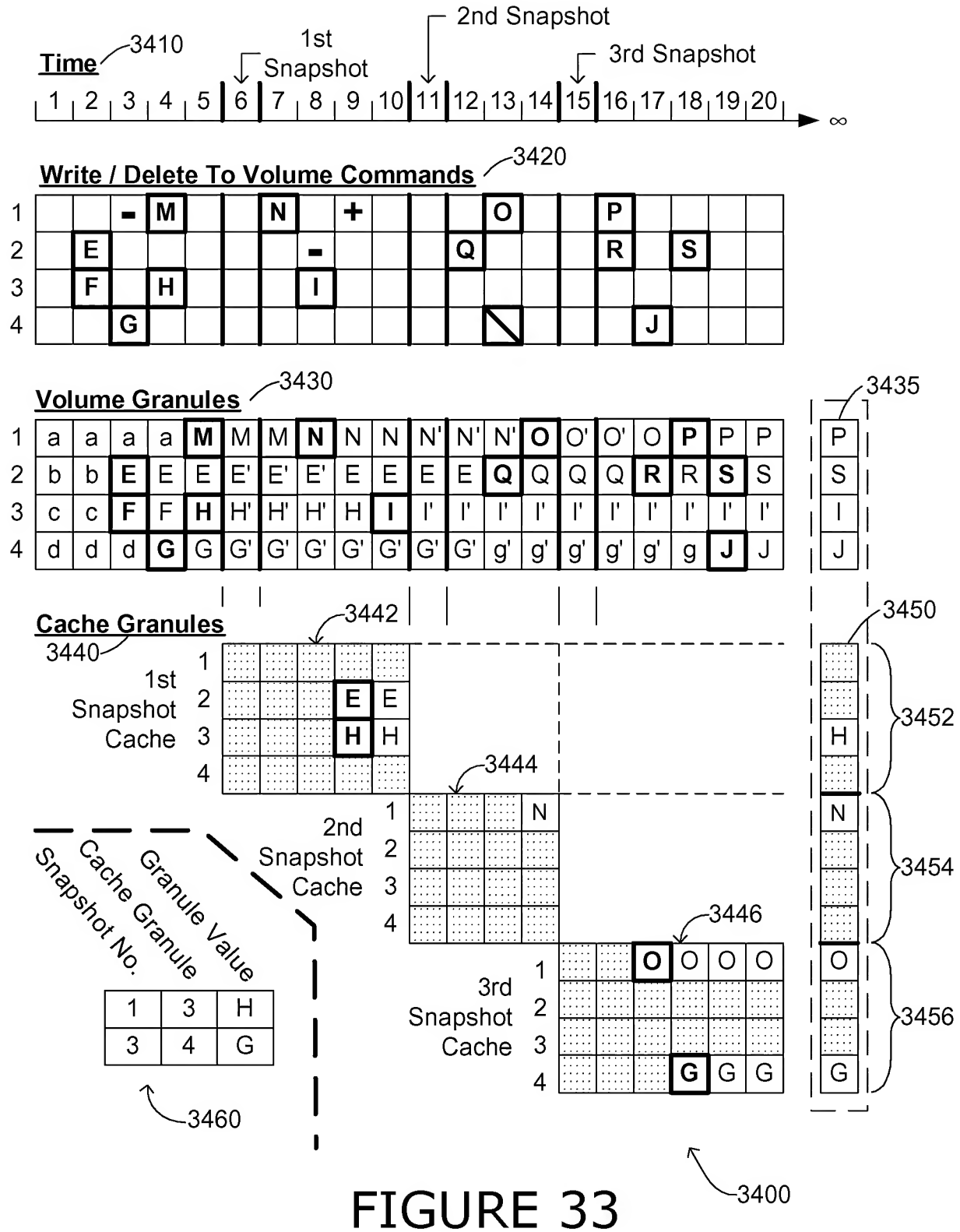

Time
3410
1st Snapshot
2nd Snapshot
3rd Snapshot
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 ∞
Write / Delete To Volume Commands
3420
Volume Granules
3430
3435
Cache Granules
3440
3442
3444
3446
3450
1st Snapshot Cache
2nd Snapshot Cache
3rd Snapshot Cache
3452
3454
3456
Snapshot No.
Cache Granule
Granule Value
1 3 H
3 4 G
3460
3400

FIGURE 33

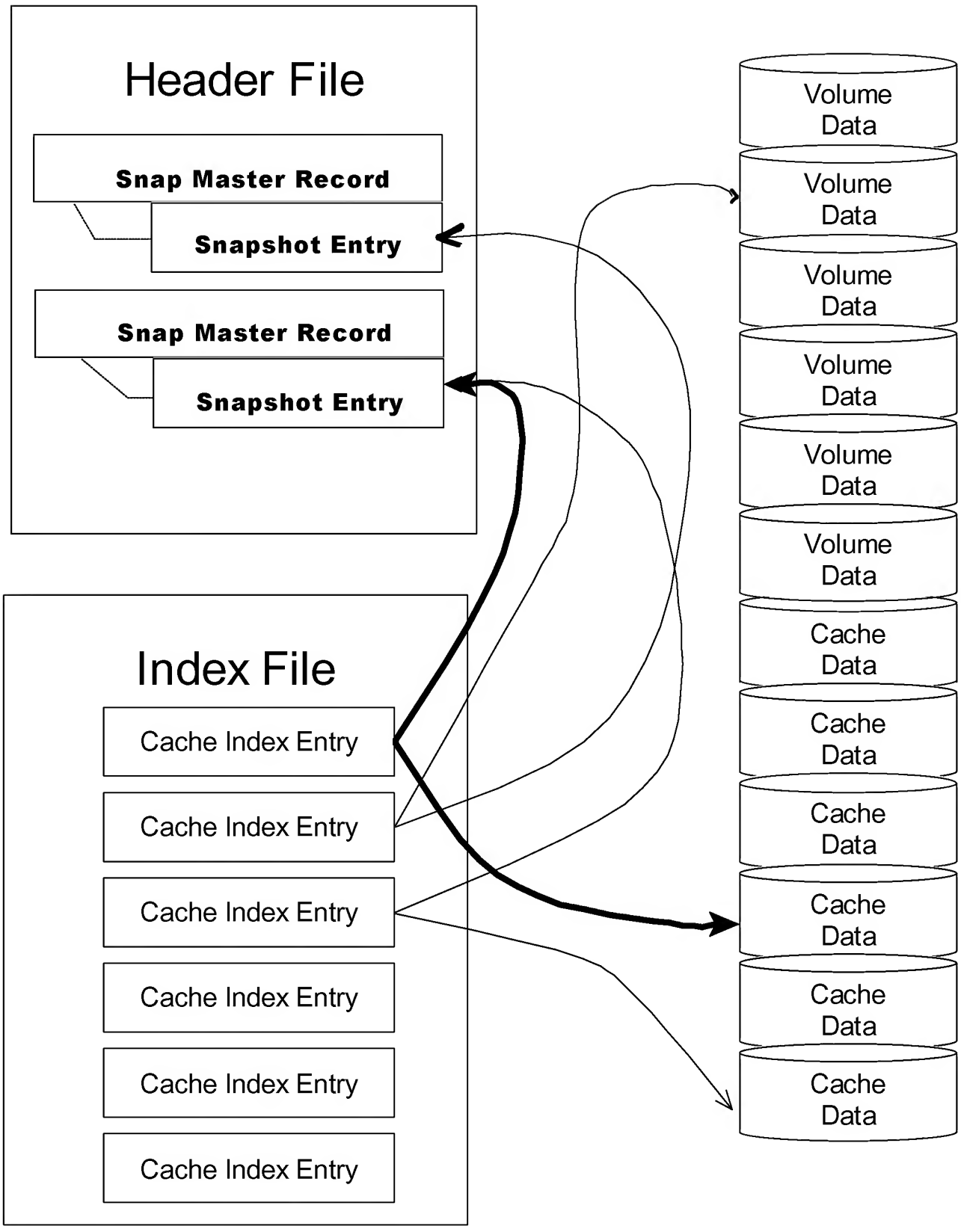

Header File
Snap Master Record
Snapshot Entry
Snap Master Record
Snapshot Entry
Index File
Cache Index Entry
Cache Index Entry
Cache Index Entry
Cache Index Entry
Cache Index Entry
Cache Index Entry
Volume Data
Volume Data
Volume Data
Volume Data
Volume Data
Volume Data
Cache Data
Cache Data
Cache Data
Cache Data
Cache Data
Cache Data

FIGURE 34

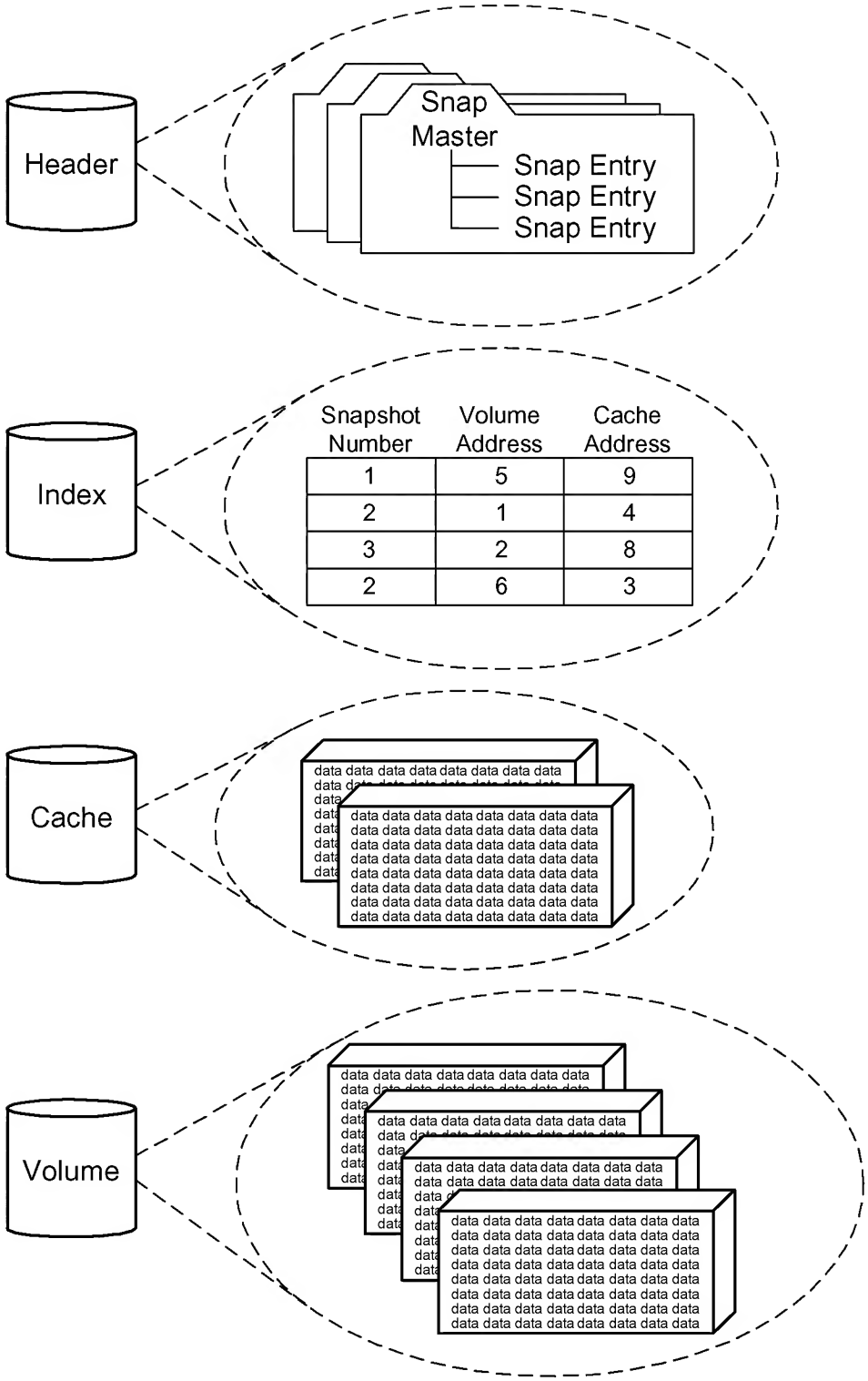

Header
Snap
Master
Snap Entry
Snap Entry
Snap Entry
Index
Snapshot Number
Volume Address
Cache Address
1 5 9
2 1 4
3 2 8
2 6 3
Cache
Volume

FIGURE 35

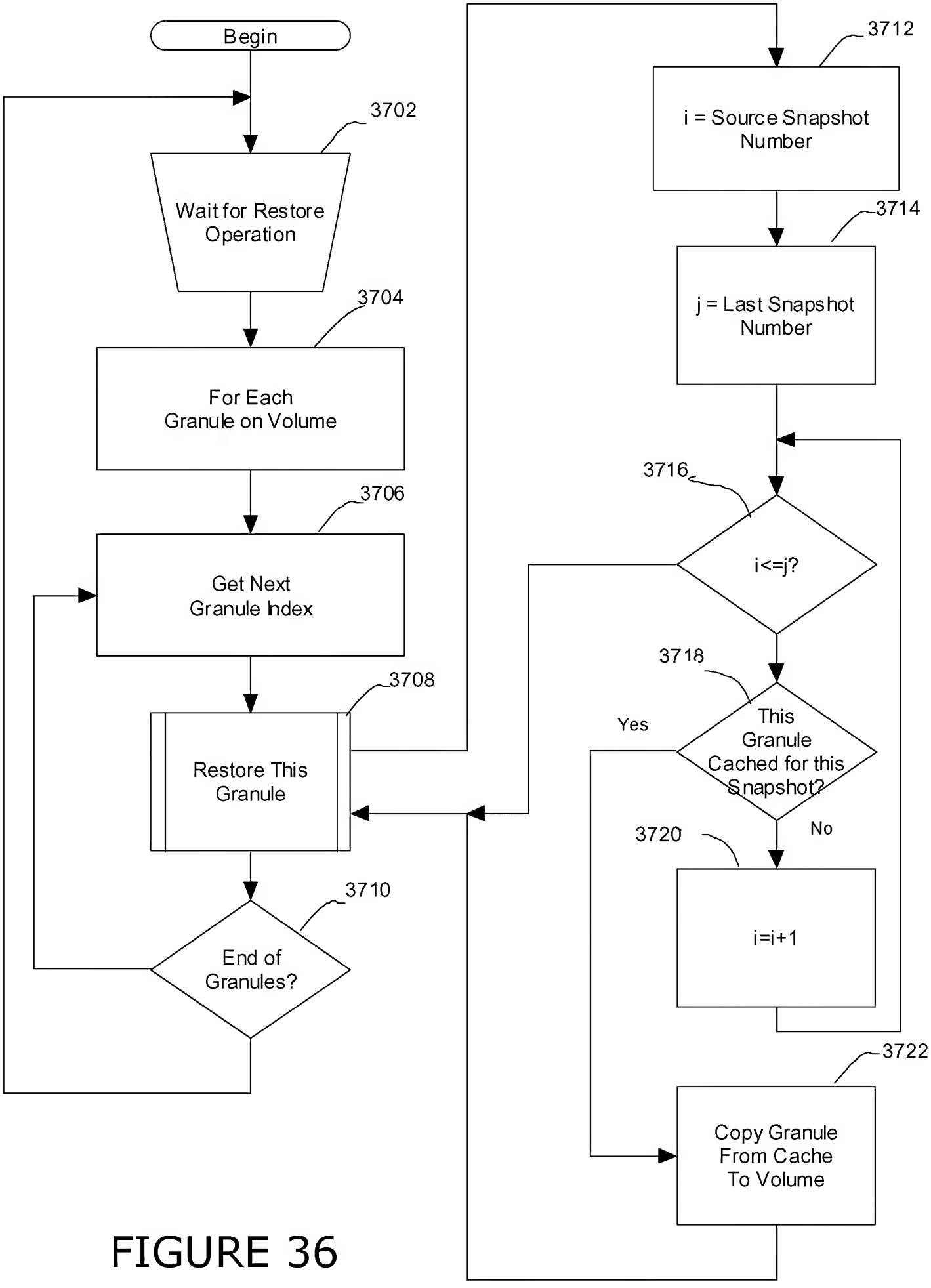

Begin
3702
Wait for Restore Operation
3704
For Each Granule on Volume
3706
Get Next Granule Index
3708
Restore This Granule
3710
End of Granules?
3712
i = Source Snapshot Number
3714
j = Last Snapshot Number
3716
i<=j?
3718
This Granule Cached for this Snapshot?
Yes
No
3720
i=i+1
3722
Copy Granule From Cache To Volume

FIGURE 36

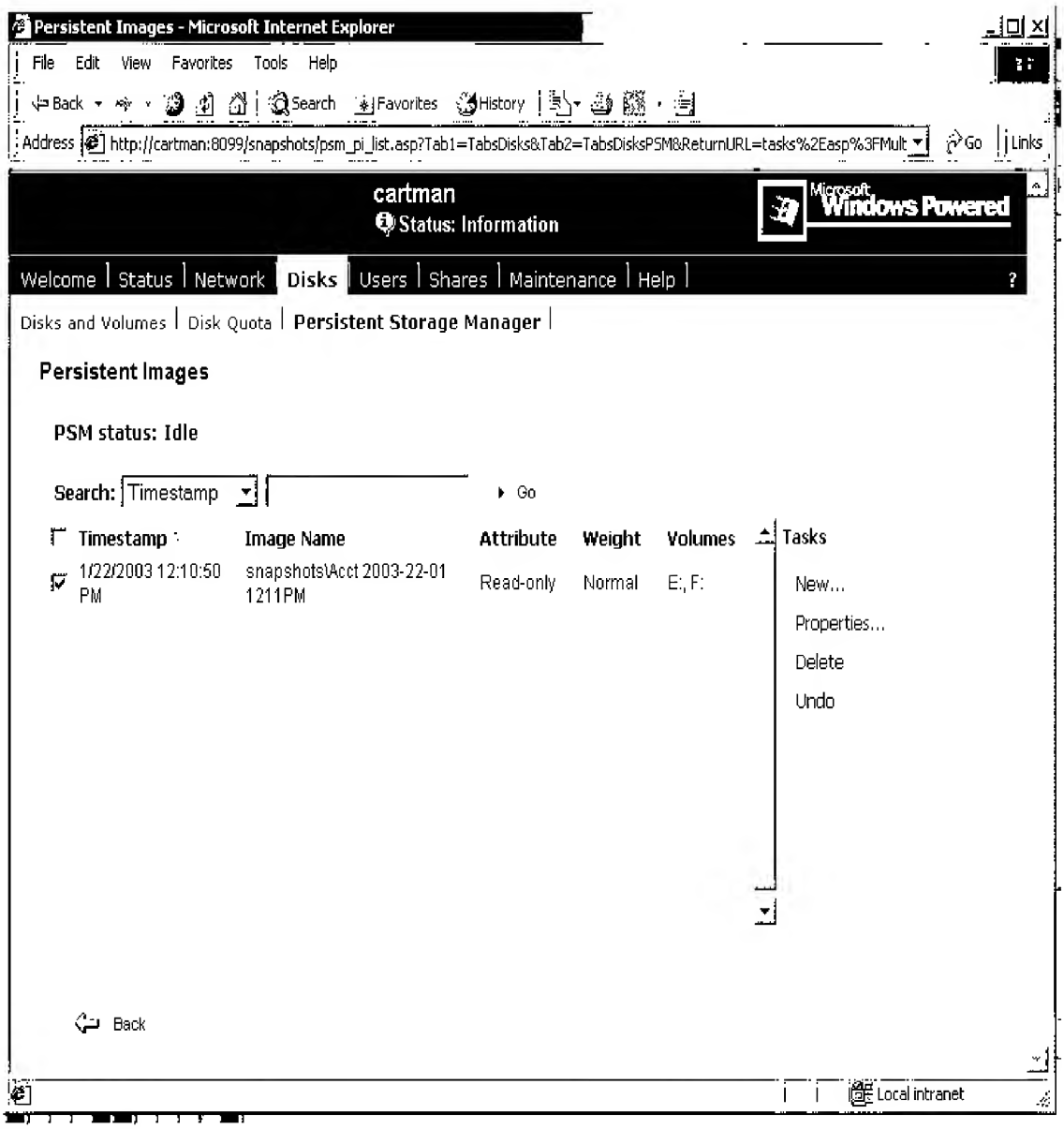

Persistent Images - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://cartman:8099/snapshots/psm_pi_list.asp?Tab1=TabsDisks&Tab2=TabsDisksPSM&ReturnURL=tasks%2Easp%3FMult
Go Links
cartman
Status: Information
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help |
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Persistent Images
PSM status: Idle
Search: Timestamp
Go
Timestamp
Image Name
Attribute
Weight
Volumes
1/22/2003 12:10:50 PM
snapshots\Acct 2003-22-01 1211PM
Read-only
Normal
E:, F:
Tasks
New...
Properties...
Delete
Undo
Back
Local intranet

FIGURE 37

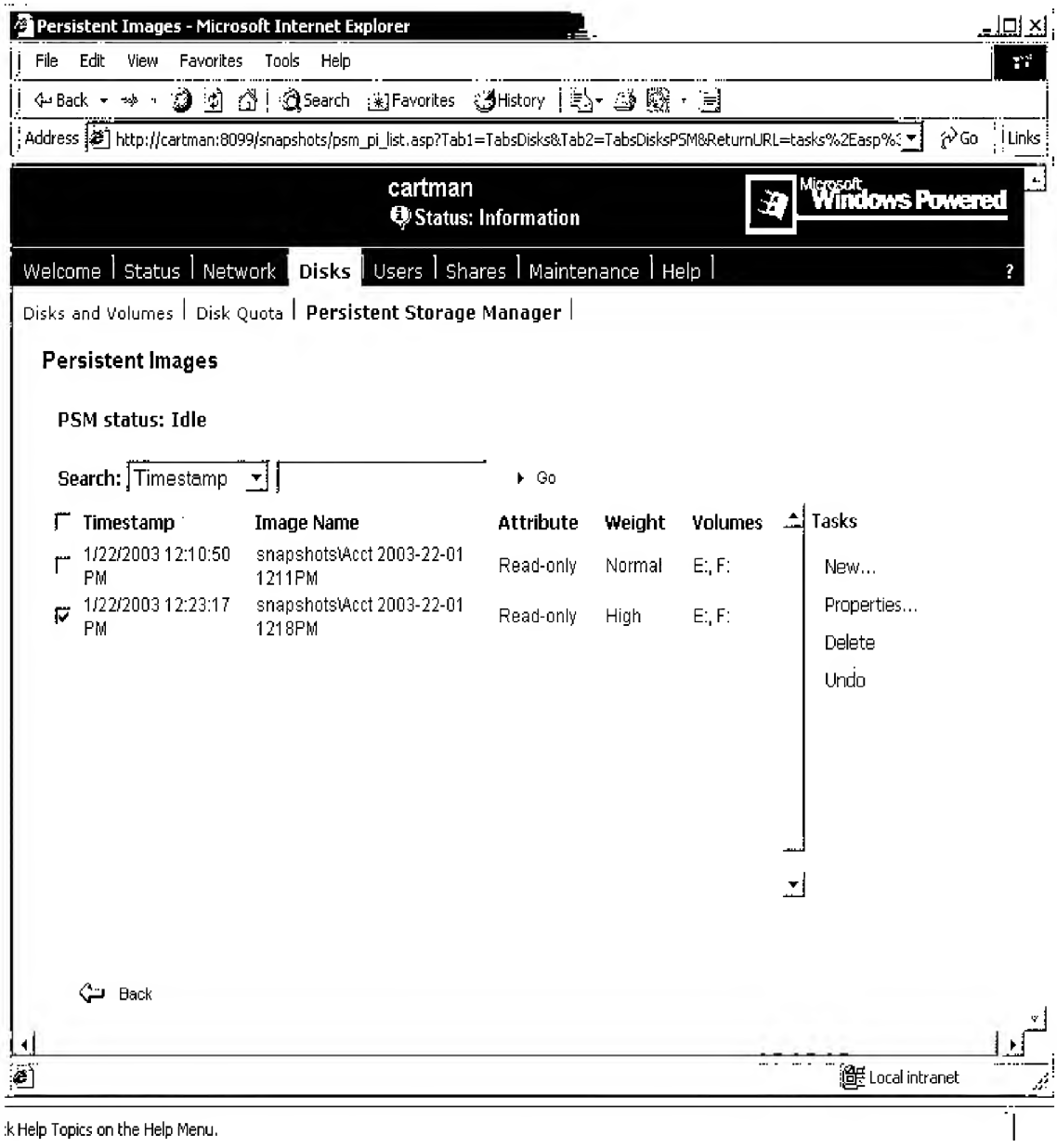

Persistent Images - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://cartman:8099/snapshots/psm_pi_list.asp?Tab1=TabsDisks&Tab2=TabsDisksPSM&ReturnURL=tasks%2Easp%3
Go Links
cartman
Status: Information
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help |
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Persistent Images
PSM status: Idle
Search: Timestamp
Go
Timestamp
Image Name
Attribute
Weight
Volumes
1/22/2003 12:10:50 PM
snapshots\Acct 2003-22-01 1211PM
Read-only
Normal
E:, F:
1/22/2003 12:23:17 PM
snapshots\Acct 2003-22-01 1218PM
Read-only
High
E:, F:
Tasks
New...
Properties...
Delete
Undo
Back
Local intranet
k Help Topics on the Help Menu.

FIGURE 38

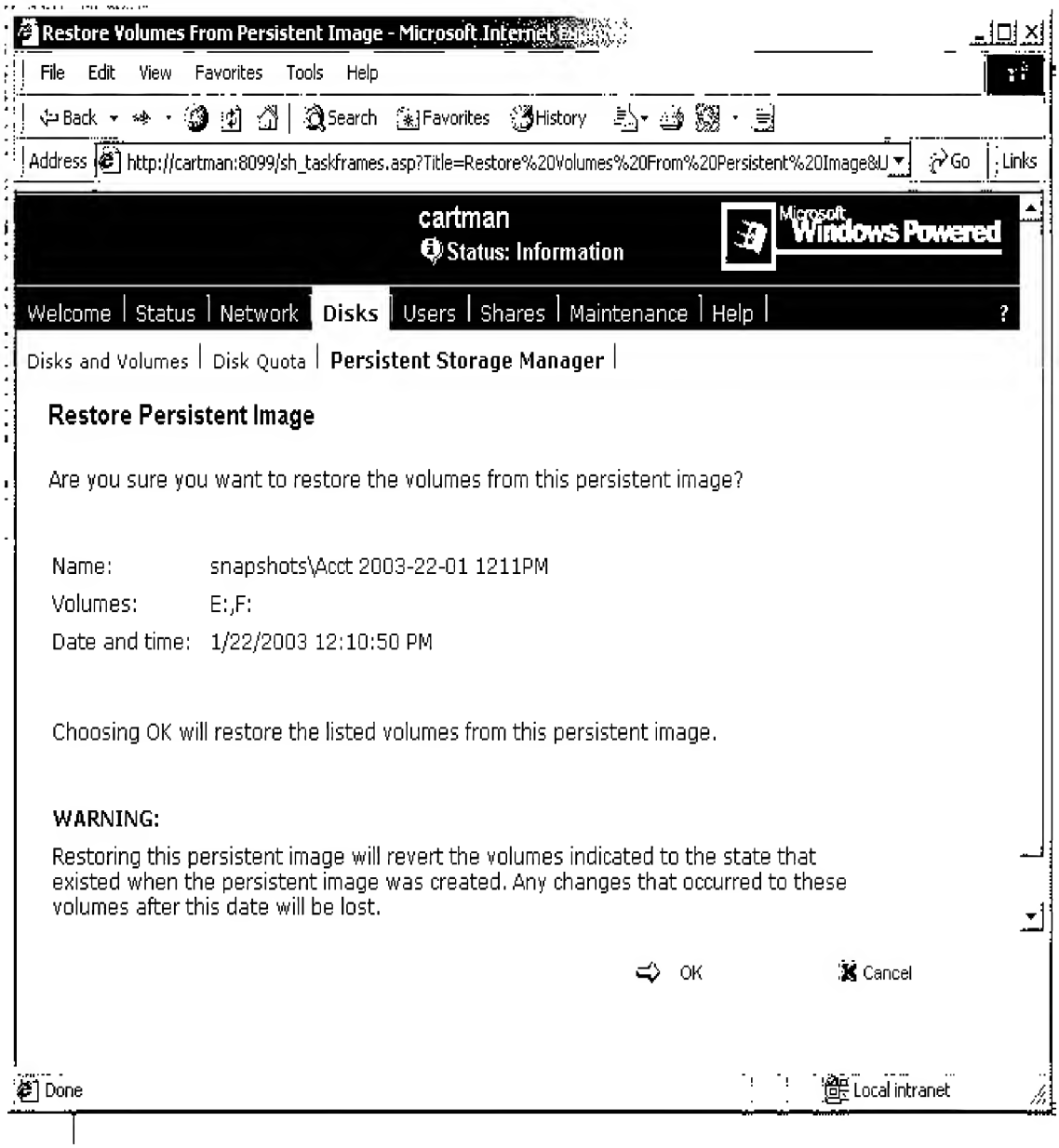

Restore Volumes From Persistent Image - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites History
Address http://cartman:8099/sh_taskframes.asp?Title=Restore%20Volumes%20From%20Persistent%20Image&U
Go Links
cartman
Status: Information
Microsoft Windows Powered
Welcome | Status | Network | Disks | Users | Shares | Maintenance | Help |
Disks and Volumes | Disk Quota | Persistent Storage Manager |
Restore Persistent Image
Are you sure you want to restore the volumes from this persistent image?
Name: snapshots\Acct 2003-22-01 1211PM
Volumes: E:,F:
Date and time: 1/22/2003 12:10:50 PM
Choosing OK will restore the listed volumes from this persistent image.
WARNING:
Restoring this persistent image will revert the volumes indicated to the state that existed when the persistent image was created. Any changes that occurred to these volumes after this date will be lost.
OK
Cancel
Done
Local intranet

FIGURE 39

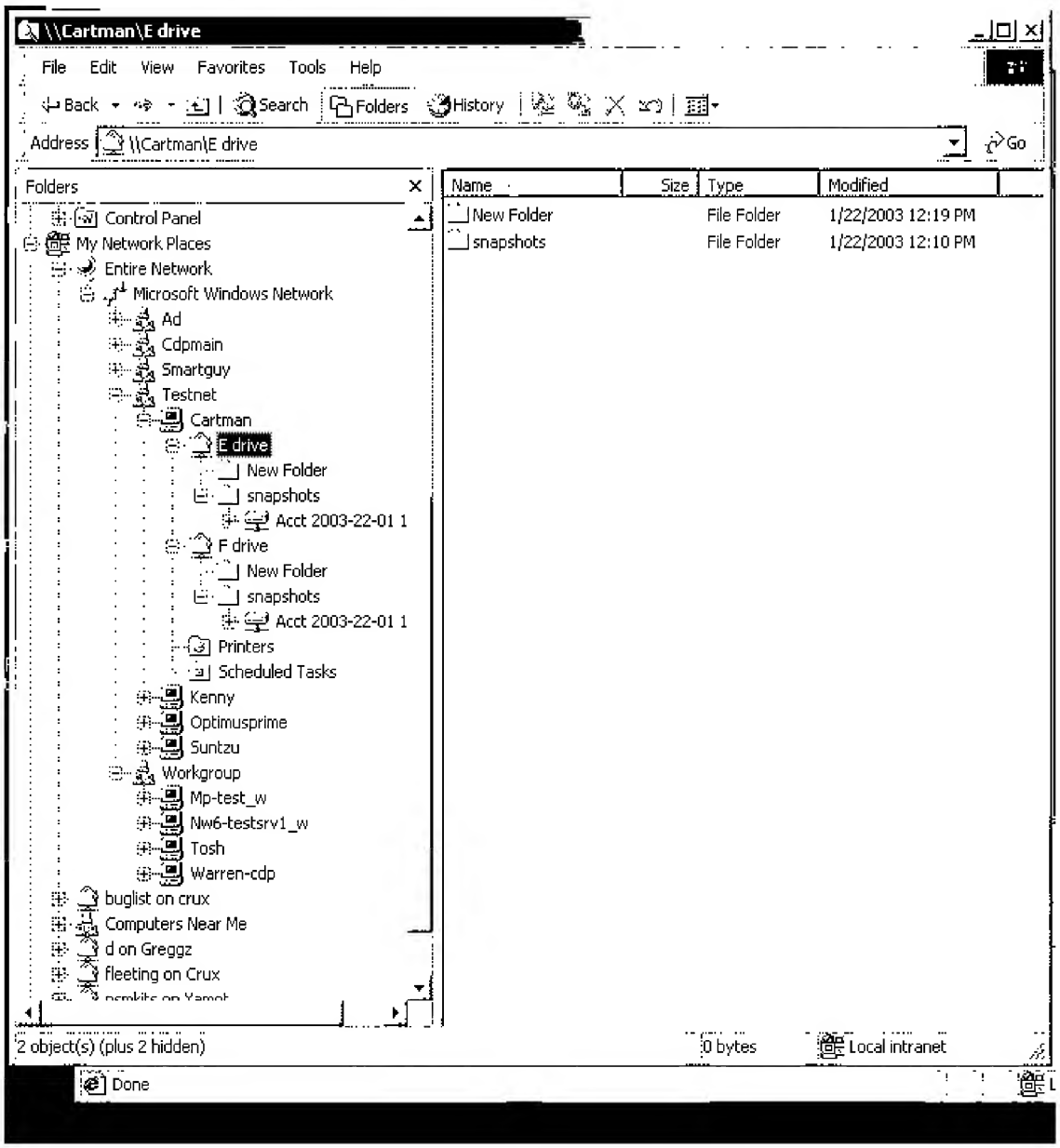

\\Cartman\E drive
File Edit View Favorites Tools Help
Back Search Folders History
Address \\Cartman\E drive
Go
Folders
Control Panel
My Network Places
Entire Network
Microsoft Windows Network
Ad
Cdpmain
Smartguy
Testnet
Cartman
E drive
New Folder
snapshots
Acct 2003-22-01 1
F drive
New Folder
snapshots
Acct 2003-22-01 1
Printers
Scheduled Tasks
Kenny
Optimusprime
Suntzu
Workgroup
Mp-test_w
Nw6-testsrv1_w
Tosh
Warren-cdp
buglist on crux
Computers Near Me
d on Greggz
fleeting on Crux
Name
Size
Type
Modified
New Folder
File Folder
1/22/2003 12:19 PM
snapshots
File Folder
1/22/2003 12:10 PM
2 object(s) (plus 2 hidden)
0 bytes
Local intranet
Done

FIGURE 40

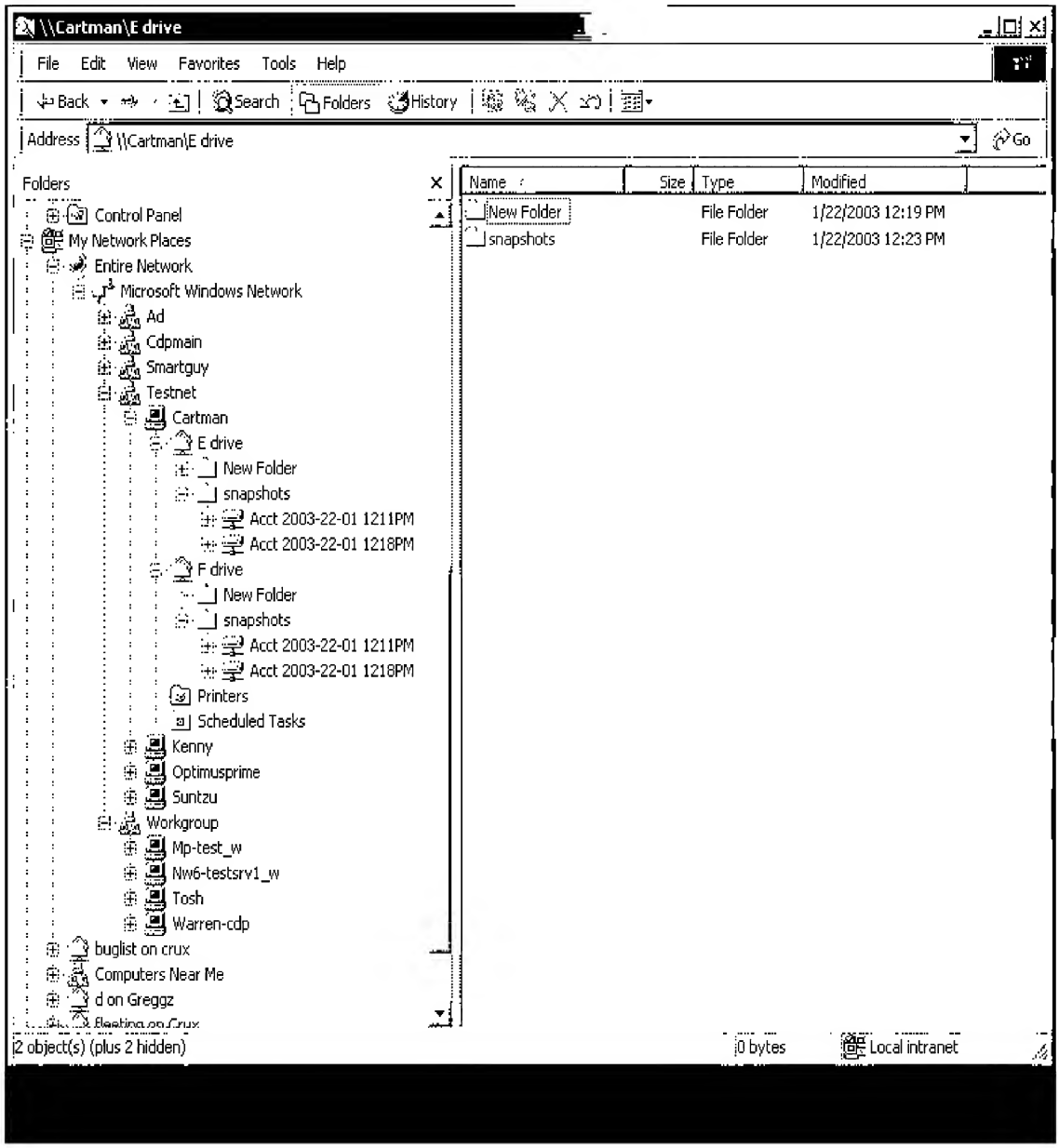

\\Cartman\E drive
File Edit View Favorites Tools Help
Back Search Folders History
Address \\Cartman\E drive
Go
Folders
Control Panel
My Network Places
Entire Network
Microsoft Windows Network
Ad
Cdpmain
Smartguy
Testnet
Cartman
E drive
New Folder
snapshots
Acct 2003-22-01 1211PM
Acct 2003-22-01 1218PM
F drive
New Folder
snapshots
Acct 2003-22-01 1211PM
Acct 2003-22-01 1218PM
Printers
Scheduled Tasks
Kenny
Optimusprime
Suntzu
Workgroup
Mp-test_w
Nw6-testsrv1_w
Tosh
Warren-cdp
buglist on crux
Computers Near Me
d on Greggz
Name
Size
Type
Modified
New Folder
File Folder
1/22/2003 12:19 PM
snapshots
File Folder
1/22/2003 12:23 PM
2 object(s) (plus 2 hidden)
0 bytes
Local intranet

FIGURE 41

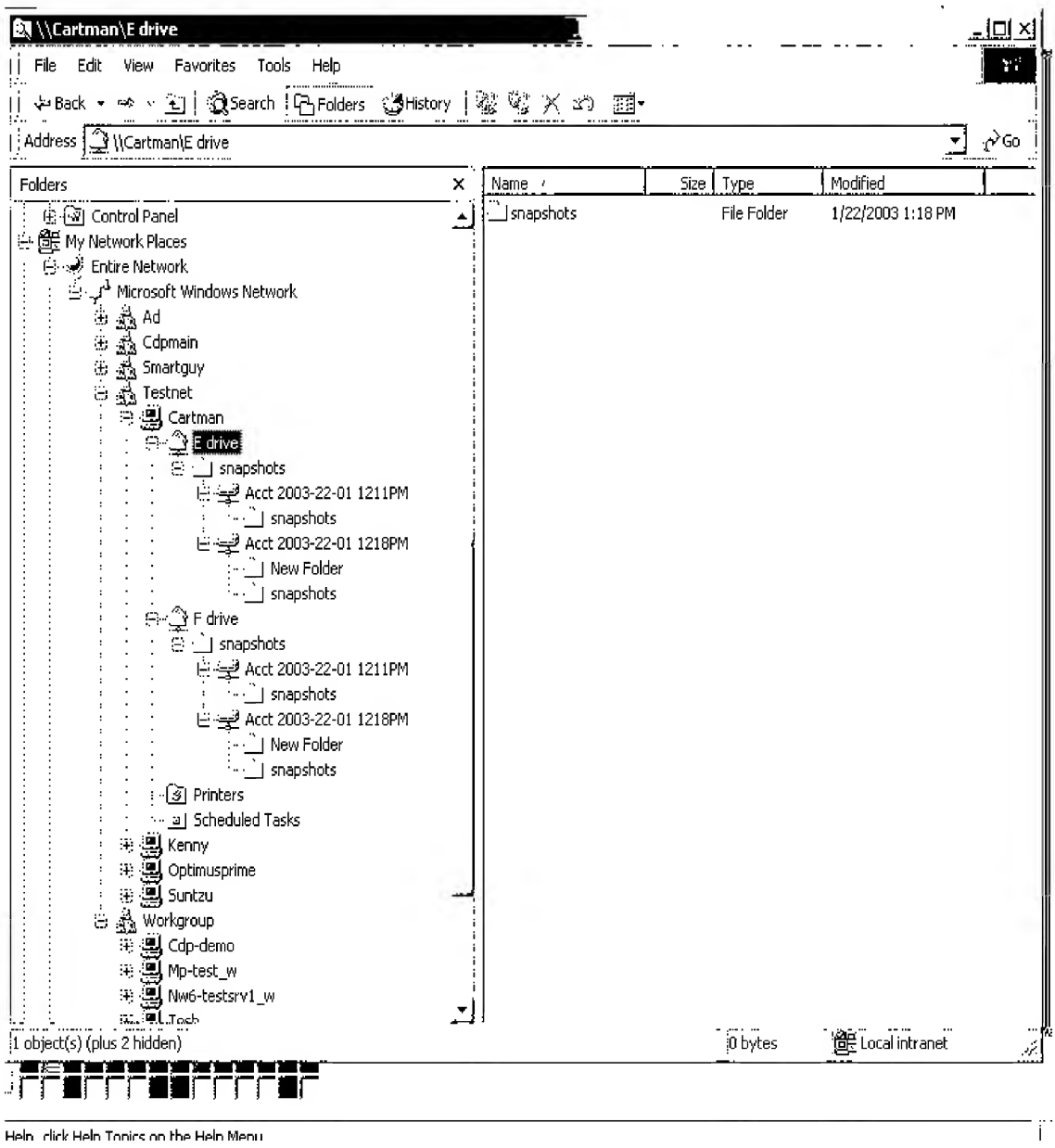

\\Cartman\E drive
File Edit View Favorites Tools Help
Back Search Folders History
Address \\Cartman\E drive
Go
Folders
Control Panel
My Network Places
Entire Network
Microsoft Windows Network
Ad
Cdpmain
Smartguy
Testnet
Cartman
E drive
snapshots
Acct 2003-22-01 1211PM
snapshots
Acct 2003-22-01 1218PM
New Folder
snapshots
F drive
snapshots
Acct 2003-22-01 1211PM
snapshots
Acct 2003-22-01 1218PM
New Folder
snapshots
Printers
Scheduled Tasks
Kenny
Optimusprime
Suntzu
Workgroup
Cdp-demo
Mp-test_w
Nw6-testsrv1_w
Name
Size
Type
Modified
snapshots
File Folder
1/22/2003 1:18 PM
1 object(s) (plus 2 hidden)
0 bytes
Local intranet
Help, click Help Topics on the Help Menu

FIGURE 42

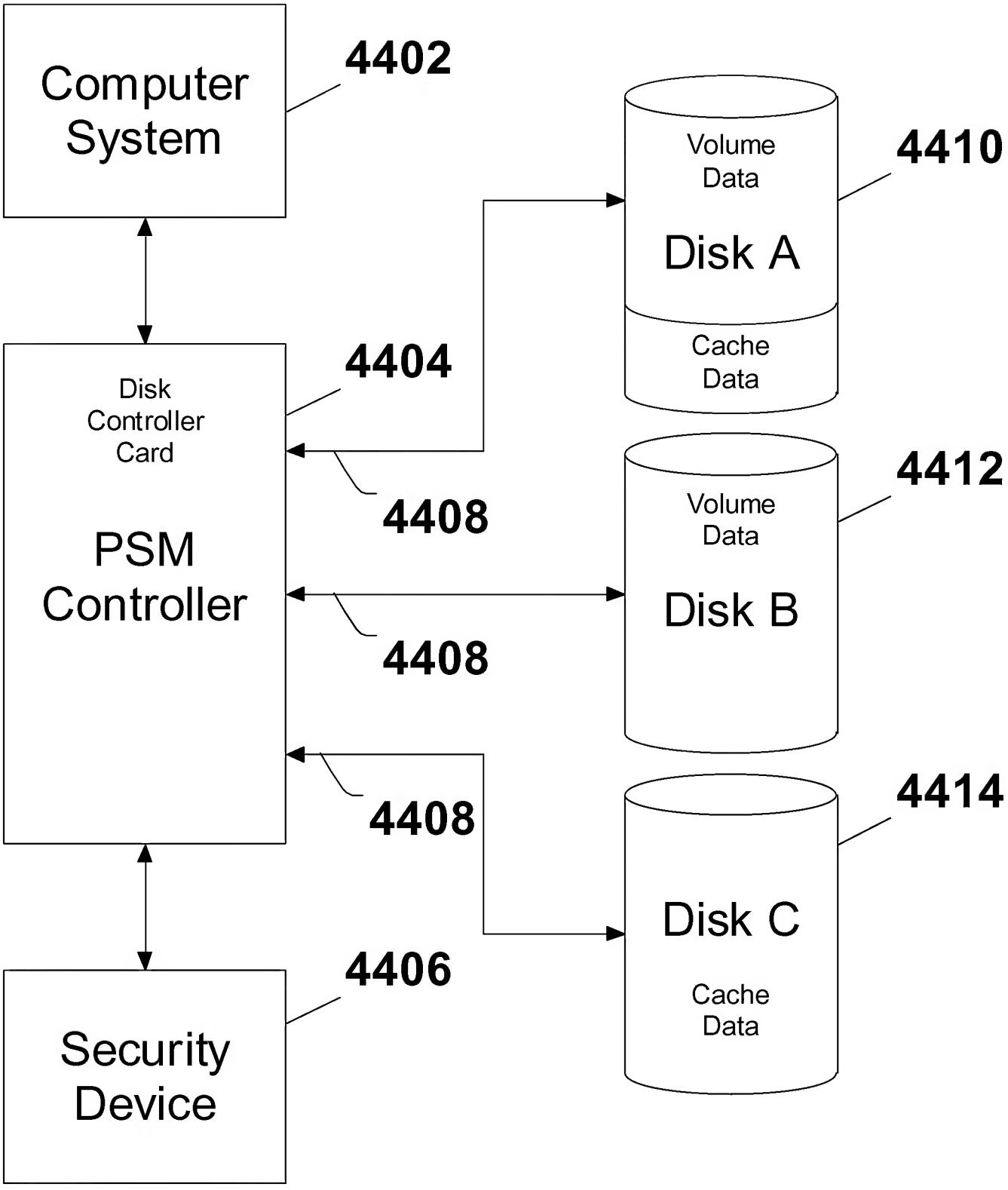

Computer System
4402
Volume Data
Disk A
Cache Data
4410
Disk Controller Card
4404
4408
PSM Controller
Volume Data
Disk B
4412
4408
4408
4414
Disk C
Cache Data
Security Device
4406

FIGURE 43

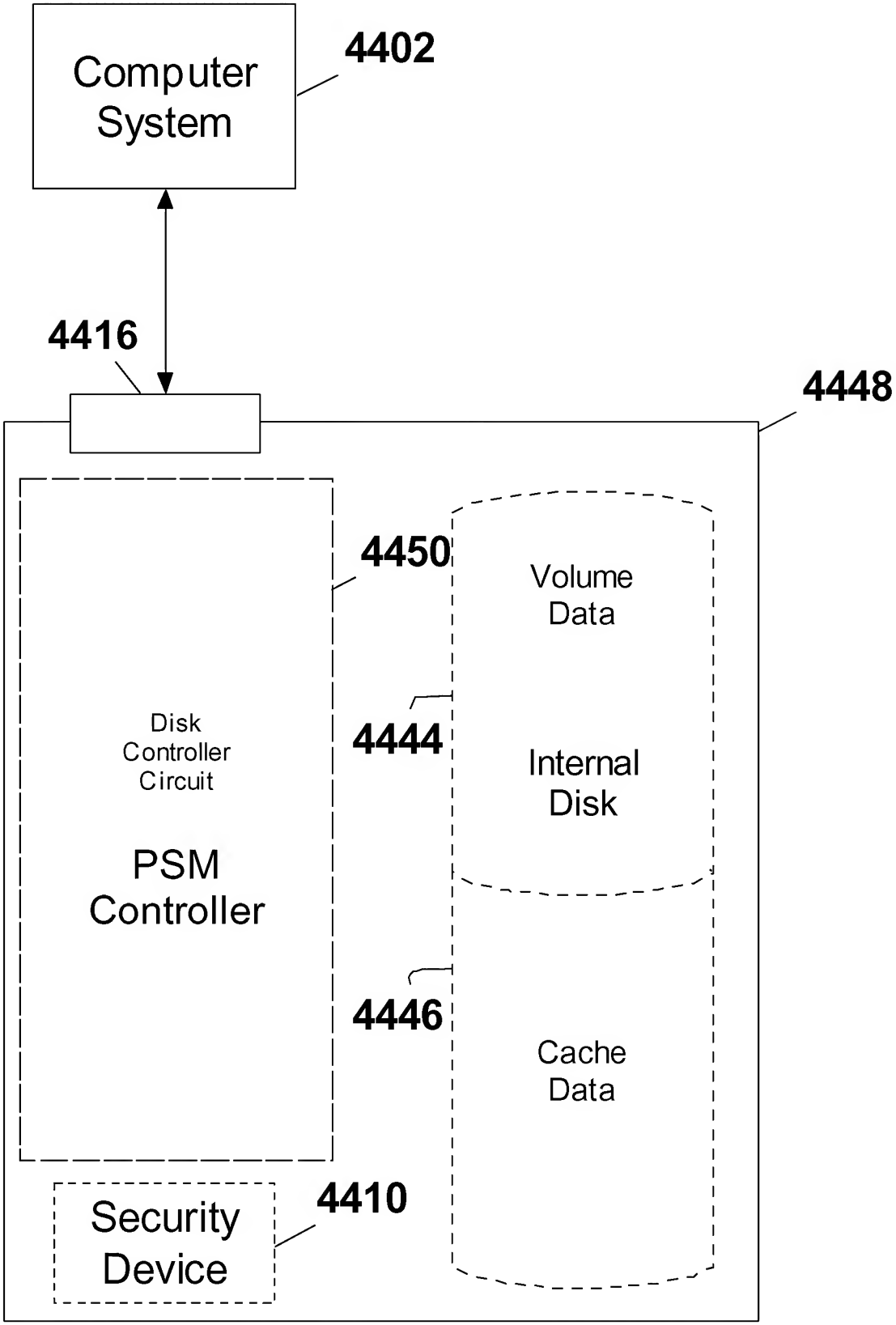

Computer System
4402
4416
4448
4450
Volume Data
Disk Controller Circuit
4444
Internal Disk
PSM Controller
4446
Cache Data
Security Device
4410

FIGURE 44

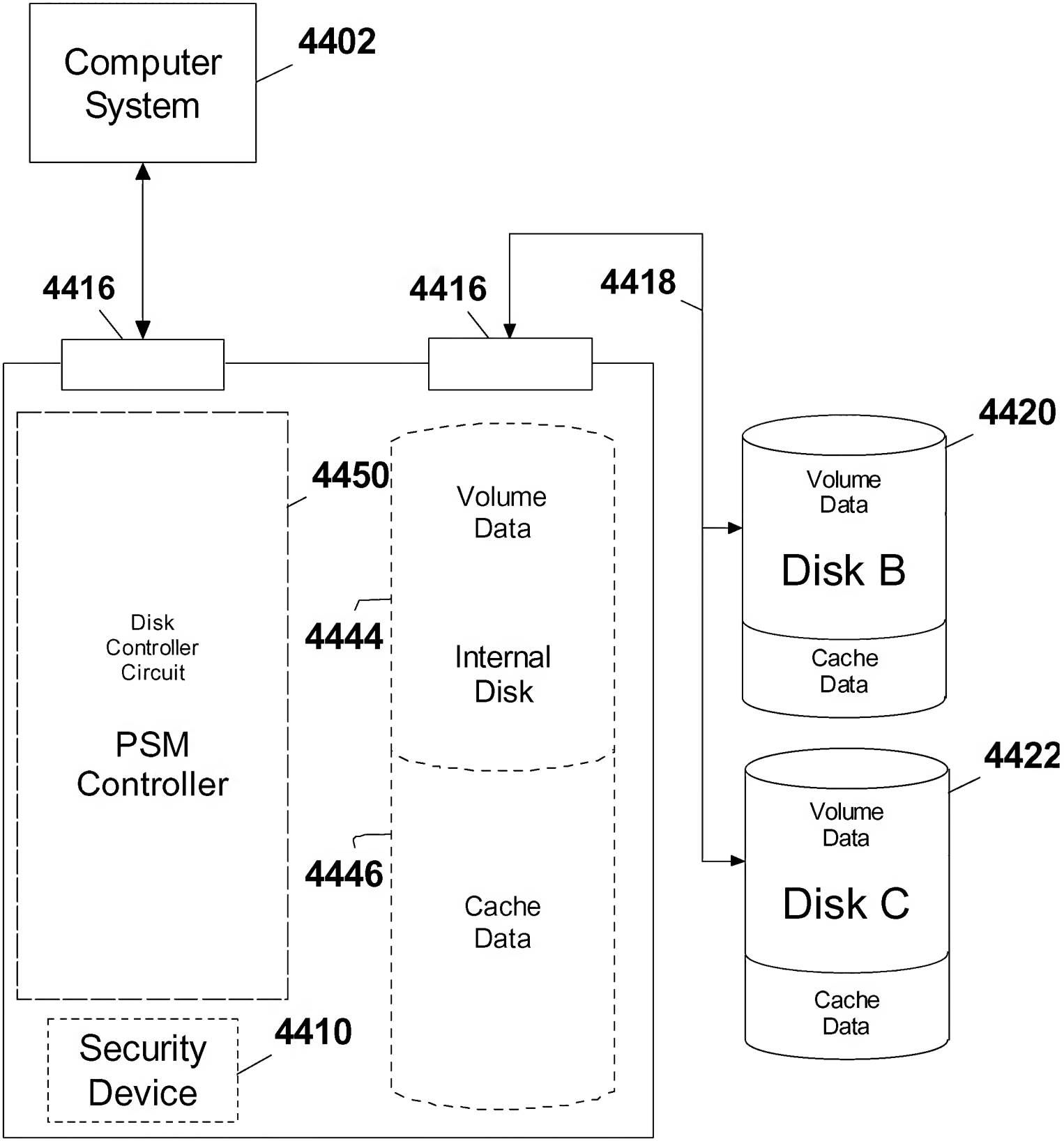

Computer System
4402
4416
4416
4418
4420
4450
Volume Data
Disk B
Disk Controller Circuit
4444
Internal Disk
Cache Data
PSM Controller
4422
Volume Data
4446
Disk C
Cache Data
Cache Data
Security Device
4410

FIGURE 45